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University of Wisconsin

LEWIS THOMAS
Memorial Sloan-Kettering Cancer Center

Director

JOHN H. GIBBONS

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INDIAN HEALTH CARE

CONGRESS OF THE UNITED STATES
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Foreword

American Indians and Alaska Natives have a unique historical and legal relationship with the Federal Government. Through treaties and statutes, the Federal Government acts as a trustee for Indian tribes. In this "government-to-government" relationship, Federal programs for Indians are administered principally by the Bureau of Indian Affairs in the Department of the Interior, except for medical and health-related services, which are provided through the Indian Health Service, a component of the Public Health Service in the Department of Health and Human Services.

The health of Indian people still lags behind the health status of the general U.S. population, and there are substantial differences in health status and causes of illness among the nearly 300 Indian tribes and more than 200 Alaska Native villages in the United States. Continuing concerns over the health of Indian people led the House Energy and Commerce Committee and its Subcommittee on Health and the Environment to request that OTA examine the health status of Indians and the services and technologies that are provided to them through Federal Indian health programs. The request was also supported by the Senate Select Committee on Indian Affairs and by the Chairman and Vice-Chairman of OTA's Congressional Board, one of whom was also acting in his capacity as Chairman of the House Committee on Interior and Insular Affairs.

An advisory panel, chaired by Rashi Fein, Professor of the Economics of Medicine, Harvard Medical School, provided guidance and assistance during the assessment. Also, four public meetings were held (in Portland, Oregon; Phoenix, Arizona; Rapid City, South Dakota; and Tulsa, Oklahoma) to provide tribes and their representatives the opportunity to comment on assessment activities and to confirm the information that OTA had collected. Site visits to nearby reservations and health facilities were also conducted as part of these activities. A large number of individuals from Indian tribes and organizations, the Federal Government, academia, the private sector, and the public provided information and reviewed drafts of the report.

OTA gratefully acknowledges the contribution of each of these individuals. As with all OTA reports, the content of the assessment is the sole responsibility of OTA and does not necessarily constitute the consensus or endorsement of the advisory panel or the Technology Assessment Board. Key staff responsible for the assessment were Lawrence Miike, Ellen M. Smith, Denise Dougherty, Ramona M. Montoya, and Brad Larson.

John H. Gibbons

JOHN H. GIBBONS
Director

Indian Health Care Advisory Panel

Rashi Fein, *Chair*
Department of Social Medicine and Health Policy, Harvard Medical School

James A. Crouch
Bureau of Rural Health Services
Utah Department of Health

Ada Deer
School of Social Work and Office of Native American Programs
University of Wisconsin, Madison

Ronald G. Faich
Demographer
The Navajo Tribe
Window Rock, AZ

Joel Frank
United South and Eastern Tribes, Inc.
Seminole Tribe
Hollywood, FL

Forrest J. Gerard
Washington, DC

Ray Goetting
New Laguna, NM

Mario Gutierrez
California Rural Indian Health Board
Sacramento, CA

Gerald Hill
VA Medical Center
San Francisco, CA

Violet Hillaire
Bellingham, WA

Joe Jacobs[1]
Bureau of Health Care Delivery and Assistance
Public Health Service
U.S. Department of Health and Human Services

Emery Johnson
Rockville, MD

Patricia King
Georgetown Law Center
Washington, DC

Irving Lewis
Department of Epidemiology and Social Medicine
Albert Einstein College of Medicine

Ethel Lund
Southeast Alaska Regional Health Corp.
Juneau, AK

Clark Marquart
Indian Health Management, Inc.
Rosebud, SD

Robert Oseasohn
School of Public Health
University of Texas, San Antonio

Norine Smith
Indian Health Board, Inc.
Minneapolis, MN

Father Ted Zuern
Bureau of Catholic Indian Missions
Washington, DC

---

[1] Panel member until August 1985.

NOTE: OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.

OTA Project Staff—Indian Health Care

Roger C. Herdman, *Assistant Director, OTA*
Health and Life Sciences Division

Clyde J. Behney, *Health Program Manager*

Lawrence Miike, *Project Director*

Ellen M. Smith, *Analyst*
Denise M. Dougherty, *Analyst*
Ramona M. Montoya, *Research Analyst*
Brad Larson, *Research Assistant*

Other Contributing Staff

Becky Berka, *Research Assistant*
Anne Guthrie, *Research Analyst*
Kerry Britten Kemp, *Division Editor*
Pamela J. Simerly, *Research Assistant*
Virginia Cwalina, *Administrative Assistant*
Carol A. Guntow, *Secretary/Word Processor Specialist*
Diann G. Hohenthaner, *P.C. Specialist*

Contractors

National Indian Health Board, Denver, CO
Steven Bjorge, Washington, DC
Paul Alexander, Alexander & Karshmer, Washington, DC
Henry Cole, S. Ken Yamashita, The Futures Group, Washington, DC

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Chapter 1

Summary and Conclusions

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Chapter 1

Summary and Conclusions

INTRODUCTION

This report is an assessment of health care for American Indians and Alaska Natives who are eligible for medical and health-related services from the Federal Government. The Federal agency that is responsible for providing these services is the Indian Health Service (IHS), a component of the Public Health Service (PHS) in the Department of Health and Human Services (DHHS).

The basic population that is eligible for services from IHS consists of "persons of Indian descent belonging to the Indian community served by the local facilities and program." An individual is eligible for IHS care "if he is regarded as an Indian by the community in which he lives as evidenced by such factors as tribal membership, enrollment, residence on tax-exempt land, ownership of restricted property, active participation in tribal affairs, or other relevant factors in keeping with general Bureau of Indian Affairs practice in the jurisdiction" (42 CFR 36.12). Eligible Indians are not subject to an economic means test and may receive IHS services regardless of their ability to pay.

IHS estimates its service population by enumerating American Indians, Eskimos, and Aleuts living within the geographic boundaries of its service areas based on the most recent census, and adjusting those estimates for subsequent years by applying birth and death statistics. Generally, IHS service areas consist of counties that have the reservation of a federally recognized tribe within or contiguous to their borders (exceptions to this general rule include designating the States of Alaska, Nevada, and Oklahoma as IHS service areas). (There are tribes that are State-recognized only, and other tribes that are not recognized by either Federal or State governments.) Thus, even though eligibility is not limited to Indians who are members of federally recognized tribes, in practice, Federal Indian health services are directed at Indians because of their membership in (or affiliation with) tribes that are recognized by the Federal Government, and not because of the racial background of individual recipients.

This report was prepared at the request of the House Committee on Energy and Commerce and its Subcommittee on Health and the Environment, which have legislative and oversight jurisdiction over all Federal health programs funded through general revenues. The request was supported by the Senate Select Committee on Indian Affairs and by the Chairman of the House Committee on Interior and Insular Affairs, the committee with primary jurisdiction over Indian affairs in the House of Representatives.

The principal issues identified by the requesting committee were the health status of American Indians and Alaska Natives (hereinafter collectively called "Indians"), the services provided to Indians in view of their health needs, the health delivery systems in which these services are provided, and the growing problem of paying for high-cost care that cannot be provided in IHS facilities and that must be purchased from other providers of medical care.

The rest of this chapter summarizes OTA's findings and conclusions and provides options on major issues identified in this report.

Chapter 2 provides an overview of Federal-Indian relationships.

Chapter 3 provides information on the Indian population.

Chapter 4 traces the changing health problems of Indians, the current status of their health, regional differences in health status, and health problems of particular concern among Indians.

Chapter 5 describes the sources of Indian health care, with emphasis on the direct and contract care programs conducted by IHS, and the IHS facilities construction program.

Chapter 6 discusses in further detail some of the major issues identified in the previous chapters, including the effects of self-determination legislation on transfer of health services management from IHS to tribal governments; efforts to achieve greater equity in the allocation of funds among IHS service areas; the problem of high-cost cases in IHS's contract care program; and data management and use in IHS.

THE INDIAN POPULATION

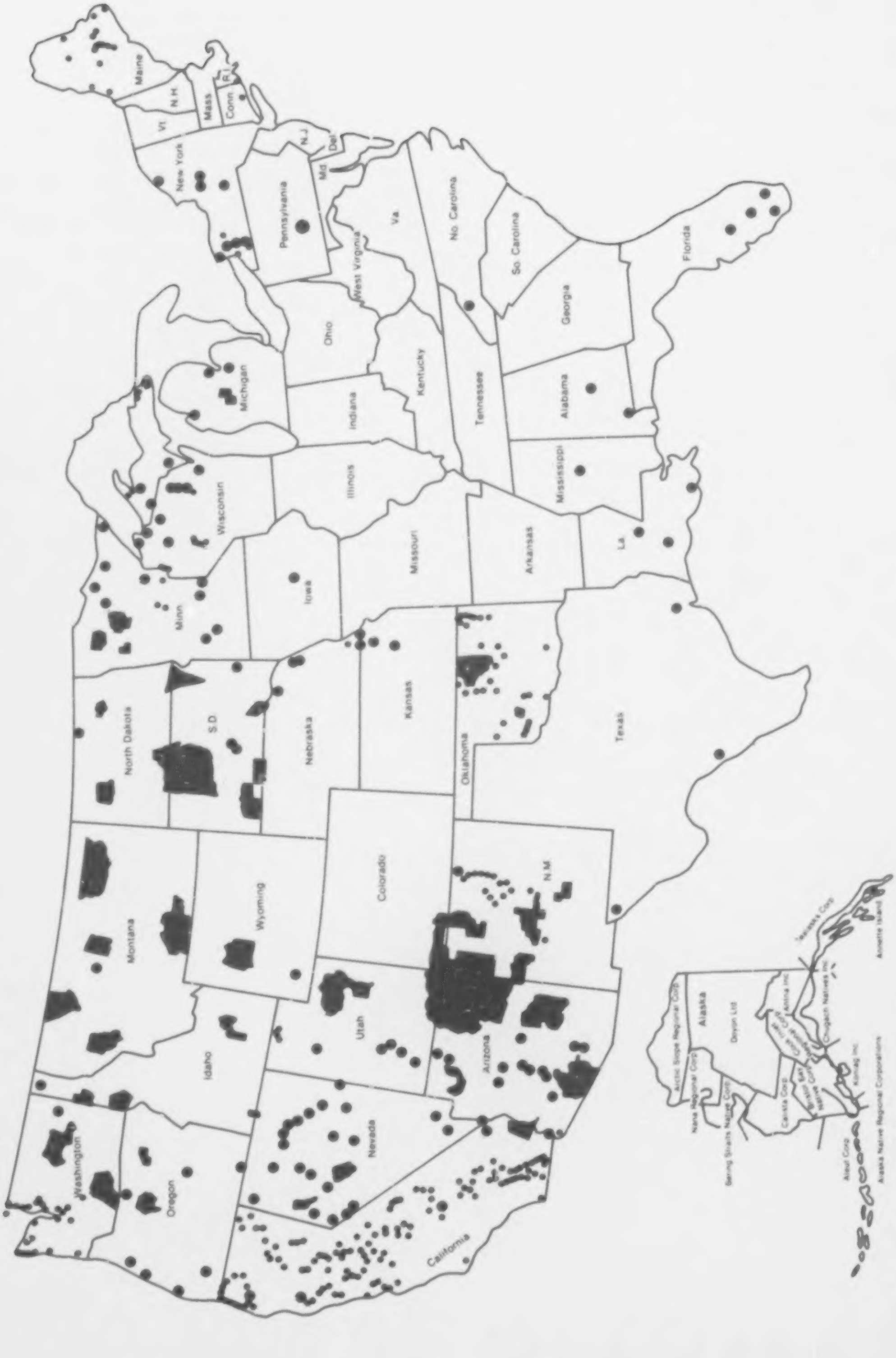
Information on the Indian population comes from three sources, the U.S. Bureau of the Census, the Bureau of Indian Affairs (BIA), and IHS. In 1980, the census allowed individuals to choose the racial group with which they most identified, instead of relying on the observations of the census takers as in the past. The census also distinguished between Indians living inside "identified areas" and Indians living elsewhere. "Identified areas" are defined as reservations, tribal trust lands, Alaska Native villages, and historic areas of Oklahoma that consist of former reservations having legally established boundaries between 1900 and 1907, excluding urban areas. BIA uses whatever information may be available for a reservation to estimate its service population and labor force participation, primarily for the purpose of providing information on employment and earnings on Indian reservations. IHS bases its service population estimates on data from the U.S. Census.

In 1980, the census identified 278 reservations and 209 Alaska Native villages (figure 1-1), and counted 1.4 million Indians, Eskimos, and Aleuts living throughout the United States both on and off reservations. The degree of Indian blood in these self-identified Indians is not known. Many tribes have a tribal-specific blood quantum requirement (e.g., one-quarter) for membership; some tribes have a simple descendancy requirement. The last relatively comprehensive survey on "blood quantum" was reported by BIA for 1950, when approximately 60.2 percent of all reservation Indians were full-blood, 26.7 percent were half-blood, 9.5 percent were one-quarter, and 3.6 percent had less than one-quarter Indian blood quantum. IHS has no blood quantum requirement for its services, and any Indian who is considered an Indian by the Indian community served by the local IHS facility is eligible for IHS services.

In 1980, 22 percent of the Indian population lived in central cities, 32 percent lived in urban areas outside central cities, and the remainder lived in nonmetropolitan areas. Thirty-seven percent actually lived inside identified Indian areas as defined by the census. The number of Indians living on reservations as enumerated in the 1980 census ranged from 104,978 on the Navajo reservation to 0 on 21 reservations (these most likely were small parcels of land, with tribal members living on nearby lands). Ten reservations accounted for 49 percent of all reservation residents. Four States had Indian populations in excess of 100,000: California, Oklahoma, Arizona, and New Mexico. The 10 Standard Metropolitan Statistical Areas (SMSAs) with the largest numbers of Indians were, in descending order, Los Angeles-Long Beach, Tulsa, Oklahoma City, Phoenix, Albuquerque, San Francisco-Oakland, Riverside-San Bernardino-Ontario, Seattle-Everett, Minneapolis-St. Paul, and Tucson. (In the summary of social and economic characteristics presented below, it should be noted that national statistics on Indians are averages derived from wide regional variations.)

In 1979, the median income for families of all races was $19,917, compared with median incomes of $13,678 for American Indian, $13,829 for Eskimo, and $20,313 for Aleut families. In 1980, 27.5 percent of American Indians had incomes that were below the poverty level, compared with 12.4 percent of the total U.S. population. Only Black persons had a higher percentage, with 29.9 percent having incomes below the poverty level. In 1980, 14 percent of all families in the U.S. were headed by women, compared with 23 percent of Indian families. The unemployment rate for Indians was more than twice that of the total population.

Figure 1-1.—Federally Recognized Indian Reservations and Alaska Native Regional Corporations, 1985

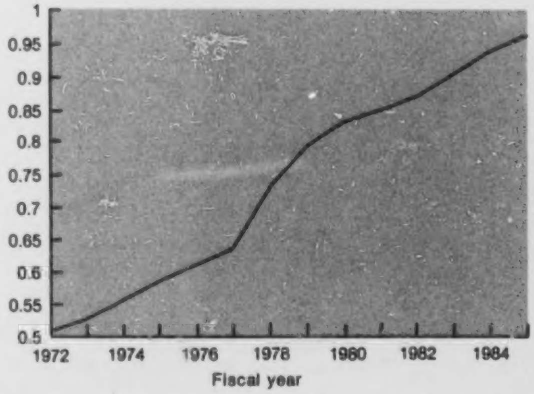

Maine
N.H.
Vt.
Mass.
R.I.
Conn.
New York
N.J.
Del.
Md.
Pennsylvania
Va.
West Virginia
No. Carolina
So. Carolina
Florida
Georgia
Ohio
Michigan
Kentucky
Tennessee
Alabama
Indiana
Mississippi
Illinois
Wisconsin
Missouri
Arkansas
La.
Iowa
Minn.
Kansas
Oklahoma
Texas
North Dakota
S.D.
Nebraska
Colorado
N.M.
Montana
Wyoming
Utah
Arizona
Idaho
Nevada
Washington
Oregon
California
Alaska
Arctic Slope Regional Corp.
Doyon Ltd.
Nana Regional Corp.
Bering Straits Native Corp.
Calista Corp.
Bristol Bay Native Corp.
Cook Inlet Region Inc.
Ahtna Inc.
Chugach Natives Inc.
Sealaska Corp.
Annette Island
Koniag Inc.
Aleut Corp.
Alaska Native Regional Corporations

SOURCE: Native American Science Education Association, 1986.

The median age for Indians in the 1980 Census was 22.9 years, compared with 30.0 years of age for the general U.S. population. In 1980, 50 percent of the total population 25 years and older had completed 4 years of high school and some college, compared with 47 percent of Aleuts, 39 percent of Eskimos, and 48 percent of American Indians. The figures for persons over 25 years old who had completed 4 or more years of college, however, were quite different: 16 percent of the total population had completed at least 4 years of college, compared with 12 percent for Aleuts, 5 percent for Eskimos, and 8 percent for American Indians.

ELIGIBILITY FOR FEDERAL INDIAN HEALTH CARE

Figure 1-2.—IHS Estimated Service Population, Fiscal Years 1972-85



SOURCE: U.S. Department of Health and Human Services, Indian Health Service, Population Statistics Staff.

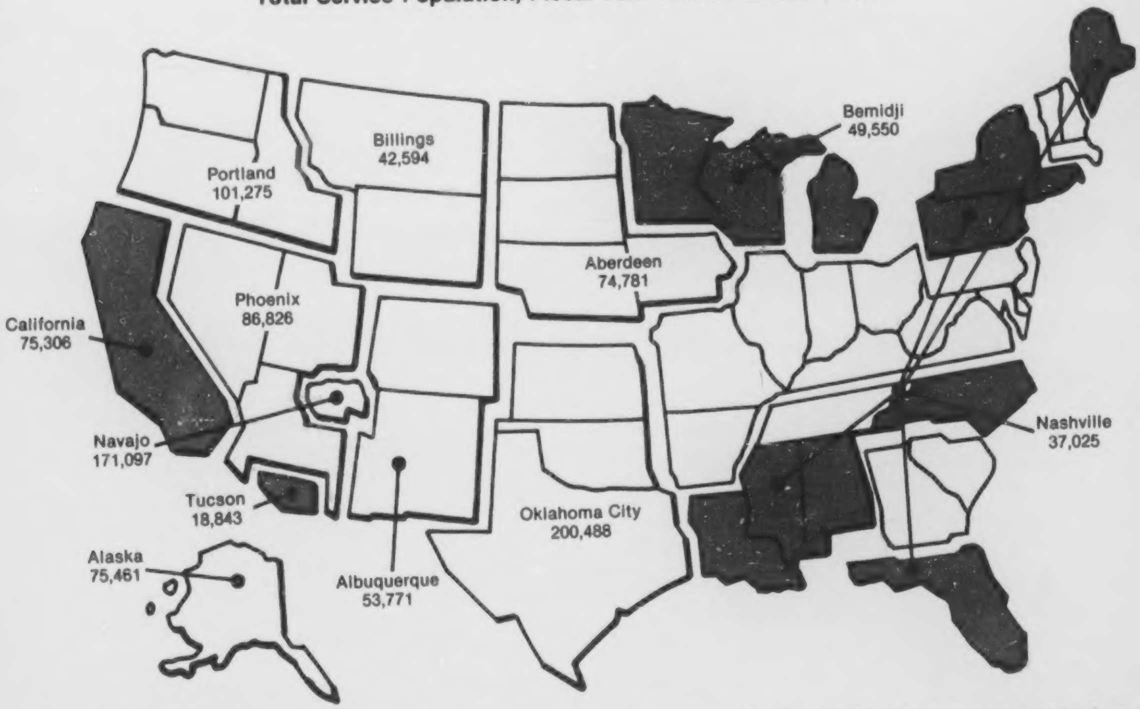
Although IHS services are not limited to reservation-based Indians, IHS clinical facilities have generally been placed on or near reservations, and most IHS funds are appropriated for eligible Indians who live on or near a reservation. One of the reasons that eligibility is not explicitly limited to members of federally recognized tribes is the variation across tribes in requirements for tribal membership. Tribal rolls may be reopened only infrequently, which would make it difficult for Indians not on the rolls to prove their eligibility for IHS services if tribal membership were the sole criterion. Another reason lies in the history of reversals in Federal Indian policies, their effects on individual tribes and Indians, and the inequities that would result if only members of tribes that are presently federally recognized were eligible for IHS services. Congress has therefore chosen not to restrict services to members of federally recognized tribes.

In 1980, approximately 850,000 of the 1.4 million self-identified Indians in the census count resided in IHS areas. Figure 1-2 illustrates growth of the estimated IHS service population from 1972 to 1985, and figure 1-3 presents the estimated 1986 IHS service population of 987,017 in the 32 reservation States, grouped according to the 12 area offices of IHS. "Reservation States" are States containing the reservations of federally recognized tribes and in which IHS services are provided.

Many tribes maintain rolls of their members and dispute the IHS population estimates, which are derived from census data. Besides the possibility of undercounting Indians in the census, many tribes count individuals as members without regard to their place of residence. Tribal rolls may list full-fledged members and others who may be enrolled but do not have the full privileges of members, such as voting rights or the right to share in tribal benefits.

In order to augment the health services available from IHS facilities, IHS purchases care from non-IHS providers through a contract care program. Currently, approximately 26 percent of the IHS clinical services budget is spent on services from non-IHS providers. Eligibility for contract care is more restrictive than for IHS direct services. To be eligible for contract care, in addition to meeting the criteria for eligibility for IHS direct services, an individual must: 1) reside on a reservation located within a contract health service delivery area (CHSDA) as designated by IHS; or 2) reside within a CHSDA and either be a member of the tribe or tribes located on that reservation or of the tribe or tribes for which the reservation was established, or maintain close economic and social ties with that tribe or tribes; or 3) be an eligible student, transient, or Indian foster child (42 CFR 36.23).

Figure 1-3.—Indian Health Service Population by Area
Total Service Population, Fiscal Year 1986 Estimate: 987,017



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Population Statistics Staff.

In most areas, the CHSDA consists of the county that includes all or part of a reservation, plus any county or counties that have a common boundary with the reservation. Although Indians eligible for IHS direct services can live anywhere, only those Indians actually living in a designated CHSDA are eligible for non-IHS care through IHS's contract care program. (It should be noted that part of the growth in the eligible population summarized in figure 1-2 is the result of adding new CHSDAs through legislated exceptions to the general rule summarized above.)

IHS administers a small contract program for urban Indian health organizations, which generally use IHS funds as core funds to attract and apply for funds from other public and private sources directed at minority and economically disadvantaged groups. Because of the use of these other sources, urban Indian health programs usually serve others besides their Indian clientele. Most urban programs provide a modest amount of direct clinical services, with their main emphasis being to help clients gain access to other available health and social services. The statutory definition of "Indians" to whom these urban programs are directed is much more liberal than the definition for eligibility for IHS direct services: "urban Indians," for example, also include members of a tribe, band, or other organized group terminated since 1940 and those recognized now and in the future by the State in which they reside (42 CFR 36.302[h,u]).

THE FEDERAL-INDIAN RELATIONSHIP

The fundamental relationship between Indian tribes and the U.S. Government was set forth in the 1830s by the U.S. Supreme Court under Chief Justice John Marshall. Indian tribes were described as "domestic dependent nations," and their relationship with the United States characterized as one that "resembles that of a ward to his guardian" (21,220). This view of the relationship originated not from any one treaty or statute, but from the Supreme Court's analysis of the relationship of the tribes with the United States. It relied on a meshing of treaties, statutes, constitutional provisions, and international law and theory. The political responsibility for dealing with Indian tribes was constitutionally assigned to the Federal Government, and the States were held to have no role in Indian affairs. **The Federal Government's responsibility is commonly known as its "trust responsibility" for Indians.**

The newly formed United States originally based much of its relationship with Indians tribes on treaties, which are the exclusive responsibility of the U.S. Senate. Since 1871, however, the United States has dealt with tribes by statute rather than by treaty, because the U.S. House of Representatives also wanted to be involved in negotiating agreements with Indian tribes.

In the 1880s, a number of statutes were passed to "civilize" Indians (the classic is the Dawes Act [24 Stats. 388 (1887)]). In this "allotment period," each adult Indian on a reservation was assigned a specific amount of land (usually 160 acres), and some relatively small amount of land was set aside for tribal purposes (schools, cemeteries, and the like). The remaining Indian lands were opened to non-Indian settlement. Indian lands were to be held in trust, as were the proceeds from the sale of "excess" lands, for a limited number of years. The theory was that during this trust period, individual Indians would become farmers and leave their Indian ways. They were to be emancipated from their tribes and become eligible for U.S. citizenship (Indians subsequently became U.S. citizens through the Citizenship Act of 1924 [8 U.S.C. 1401(b)]). It was during the allotment period that BIA became the dominant institutional force on Indian reservations (54).

The Indian Reorganization Act of 1934 (25 U.S.C. 461, *et seq.*) ended allotment, extended the trust indefinitely, allowed tribes to form federally recognized tribal governments, and established economic development programs for tribes. Following World War II, however, Federal Indian policy was again reversed. During this period, thousands of reservation Indians were forced to resettle in urban centers where they were to be trained and employed; major functions, responsibilities and jurisdiction over Indians were transferred from the Federal Government to the States (18 U.S.C. 1162; 28 U.S.C. 1360); and the Federal relationship with specific tribes was terminated, including ending services and distributing tribal assets to individual tribal members.

This "termination period" was replaced by the current phase in Federal-Indian relationships, commonly known as Indian self-determination, following the Indian Self-Determination and Education and Assistance Act of 1975 (Public Law 93-638; 25 U.S.C. 450, *et seq.*). The 1975 law provided for the transfer to tribes of functions that had been previously performed for them by the Federal Government, including the provision of health services (once assumed, tribes have the option of returning these responsibilities to the Federal Government). Furthermore, based on the Indian Reorganization Act of 1934 and subsequent judicial determinations, there is a preference for Indians for employment in IHS and BIA (42 CFR 36.41-36.43; 25 CFR 5.1-5.3).

Services, including social and health services, were provided to Indian tribes from the very beginning of the United States as an independent nation. Congress routinely appropriated funds for these purposes, though there was no specific statutory authority to do so until 1921. In that year, the Snyder Act (25 U.S.C. 13) was passed to avoid a procedural objection to continuing to fund Indian service programs without an authorizing statute. **The Snyder Act remains the basis for most of the Indian health services provided by the Federal Government. The pertinent language in regard to health care was simply "such moneys as Congress may from time to time appropriate, for benefit, care, and assistance of the Indians through-**

Photo credit: National Archives

Indian Health Service TB Sanitarium ward, circa 1900-1925.

out the United States . . . for the relief of distress and conservation of health . . . and for the employment of . . . physicians" (25 U.S.C. 13).

While Congress has consistently provided funds for Indian service programs, the courts so far have ruled that these benefits are voluntarily provided by Congress and not mandated under the Federal Government's trust responsibility for Indian tribes. Appropriated funds are "public moneys" and not treaty or tribal funds "belonging really to the Indians" (106). The trust responsibility for Indians does not in itself constitute a legal entitlement to Federal benefits. In the absence of a treaty, statute, executive order, or agreement that provides for such benefits, the trust responsibility cannot be the basis for a claim against the Federal Government (37,79).

However, courts have relied on the trust responsibility to liberally construe treaties and statutes in favor of Indians (13). Moreover, the U.S. Supreme Court has ruled that special Indian programs are not racial in nature but based on a unique political relationship between Indian tribes and the Federal Government (88).

The Federal Government's obligation to deal fairly with Indian tribes when Snyder Act benefits are involved was addressed in 1974 in *Morton* v. *Ruiz* (89), which determined that reasonable classifications and eligibility requirements could be created in order to allocate limited funds. In *Morton* v. *Ruiz*, the Supreme Court found that BIA had not complied with its own internal procedures, nor had it published its general assistance eligibility criteria in keeping with the rulemaking requirements of the Administrative Procedure Act (5 U.S.C. 706). BIA had recognized the necessity of formally publishing its substantive policies and had placed itself under the act's procedures.

The Administrative Procedure Act also contains the standard used by the courts to review Federal agency decisions and policies. Under the act, a Federal agency's action is presumed to be valid and must be confirmed if challenged in court as long as it is not "arbitrary, capricious, or otherwise not in accordance with law" (5 U.S.C. 706 [2][A]). An action is valid if all the relevant factors were considered in its development and if any discernable rational basis existed for the agency's action (22).

Courts will not address a larger issue if a more circumscribed ruling is possible, however, so the constitutional implications of *Morton v. Ruiz* have never been fully litigated. Because the Supreme Court found that BIA had placed itself under the Administrative Procedure Act but had not followed the act's procedures, the court did not address the issue of whether a stricter standard should be applied.

Another standard for judicial review of agency rulemaking is applicable to constitutional claims under the equal protection clause of the 14th amendment (25). There are two standards that are based on the equal protection clause. One is a "rational basis" test that is similar to, but not a substitute for, the standard under the Administrative Procedure Act. A second, stricter constitutional test is applied when suspect classifications are involved, for example, ancestry (96); race (81); alienage (41); or fundamental constitutional rights, such as right of interstate travel (108), right to vote (14), or right of privacy with respect to abortion (105).

In the 1980 decision of *Rincon Band of Mission Indians* v. *Califano* (104), a band of California Indians sued for their fair share of IHS resources, claiming that their constitutional rights to equal protection had been violated and that the Snyder Act was part of the Federal trust responsibility. The district court found that the plaintiffs' equal protection rights to due process under the fifth amendment had been violated. On appeal, the Ninth Circuit did not find it necessary to address the constitutional argument, because it found that IHS had breached its statutory responsibilities under the Snyder Act. The Ninth Circuit also did not address the trust question because it was not necessary to do so in reaching its decision. Thus, IHS must at least meet the requirements of the Administrative Procedure Act in administering health services to Indians. Since the court determined that IHS had not met the act's standard, whether a constitutional standard is required has never been fully litigated.

In addition to the Federal Government's responsibilities for and benefits conferred to Indian tribes, there are a number of Federal programs directed at Indians as individuals and not necessarily as tribal members. Such Federal activities may exist to augment tribally oriented programs, or Indians may be included within programs that assist economically disadvantaged groups or have other social policy objectives. Examples of Federal activities to augment tribally oriented programs include the health professions scholarship program for Indian students (42 CFR 36.320-36.334) and grants for urban Indian health programs (42 CFR 36.350-36.353), which are generally used as core funds to help urban Indians become eligible for and gain access to other governmental and private sources of services to the economically disadvantaged. An example of a program that is not directed specifically at Indians but that recognizes their needs is the National Health Service Corps (NHSC). NHSC scholarship recipients must pay back their scholarships year-for-year by practicing in "health manpower shortage areas." In this program, the Indian population eligible for medical care from IHS is automatically designated as an underserved population (42 CFR Part 5, app. A).

Indians are U.S. citizens and are eligible for medical services provided to other U.S. citizens, including both Federal and State services. Through regulations, IHS services are "residual" to those of other providers—i.e., other sources of care (e.g., Medicaid, Medicare, private insurance) for which the Indian patient is eligible must be exhausted before IHS will pay for medical care. For direct IHS services, the residual payer role is discretionary (42 CFR 36.12[c]), and as a matter of policy, IHS generally will provide services to a patient in IHS facilities regardless of other resources, but will seek reimbursement from those other sources for the care provided. For contract care obtained from non-IHS providers, IHS's residual payer role is mandatory (42 CFR 36.23[f]), and IHS will not authorize contract care payments until other resources have been exhausted or a determination has been made that the patient is not eligible for alternative sources of care.

One issue that has arisen in connection with IHS's residual payer role is who is the primary, and who is the residual payer, when State or local governments also have a residual payer rule. This situation arose in litigation between IHS and Roosevelt County, Montana. The county had argued that it was not discriminating against Indians, but merely applying its alternate resource policy across the board to all eligible citizens who have double coverage, thereby meeting the "rational basis" test for judicial review (79).

Amendments to the Indian Health Care Improvement Act in 1984 contained a provision, commonly known as the "Montana amendment," that was designed to relieve several Montana counties from providing and paying for medical services to indigent Indians and would have made IHS financially responsible for medical care to indigent Indians in Montana. This IHS responsibility was to exist only where State or local indigent health services were funded from taxes from real property and the indigent Indian resided on Indian property exempt from such taxation.

President Reagan vetoed the amendments because of his objection to the "Montana amendment" (and to a provision affecting the location of IHS in DHHS). There are two principal arguments that might prevail against the position that State or local governments, instead of the IHS, can be the residual payer. First, Indians, as State citizens, are constitutionally entitled to State and local health benefits on the same basis as other citizens under the equal protection clause of the 14th amendment. The second argument is that the State or county cannot presume that Indians have a right or entitlement to IHS contract health services, and so cannot deny assistance on the grounds of double coverage. In fact, the Federal regulation on contract care expressly denies that such a right exists. In such a conflict, the supremacy clause of the U.S. Constitution should resolve the issue in favor of the IHS regulation (79).

In January 1986, the U.S. District Court for the District of Montana, Great Falls Division, ruled that the Federal Government, and not Roosevelt County, was primarily responsible for the care of the Indian plaintiff (82). Though the court did not find the trust doctrine, the Snyder Act, or the Indian Health Care Improvement Act as individually entitling Indians to Federal health care, the court found that the two statutes, read in conjunction with the trust doctrine, placed the burden on IHS to assure reasonable health care for eligible members. The court, however, did not address the equal protection and supremacy clause arguments outlined above, and the decision is being appealed (80).

A final observation is that radical changes in Federal policy toward Indians over the years have introduced a tremendous amount of complexity into the Federal-Indian relationship, of which only a fleeting glimpse can be presented in this assessment of Indian health care. Tribes may have continued to exist as cultural, political, and social entities, but they may have been officially "terminated" from recognition as tribes by the Federal Government and therefore be ineligible for services that the Government provides to recognized tribes and their members. Other tribes may be federally recognized, but their reservation lands may be only a miniscule portion of what they once had, so that most tribal members might not be living on their official reservation but on land adjacent to or in the vicinity of the reservation.

Even tribes with large reservations have been affected by changing Federal policies. Most reservations contain some land that is owned by non-Indians, a legacy of the allotment period when individual Indians were given title to a portion of the reservation and sold it to non-Indians. On some reservations, "checkerboarding," the term given to the existence of a checkerboard pattern of land ownership between Indians and non-Indians within reservation boundaries, is extensive. In addition, many reservations are in isolated rural areas, which have few economic opportunities for tribal members who wish to remain on or close to their reservation. Finally, even tribes with substantial natural resources or other forms of capital assets often find it difficult to commercialize those resources in ways that provide employment for a significant number of their members. Thus, government programs are an important source of employment, and IHS and BIA are major employers on many of the larger Indian reservations.

DELIVERY OF HEALTH SERVICES TO ELIGIBLE INDIANS

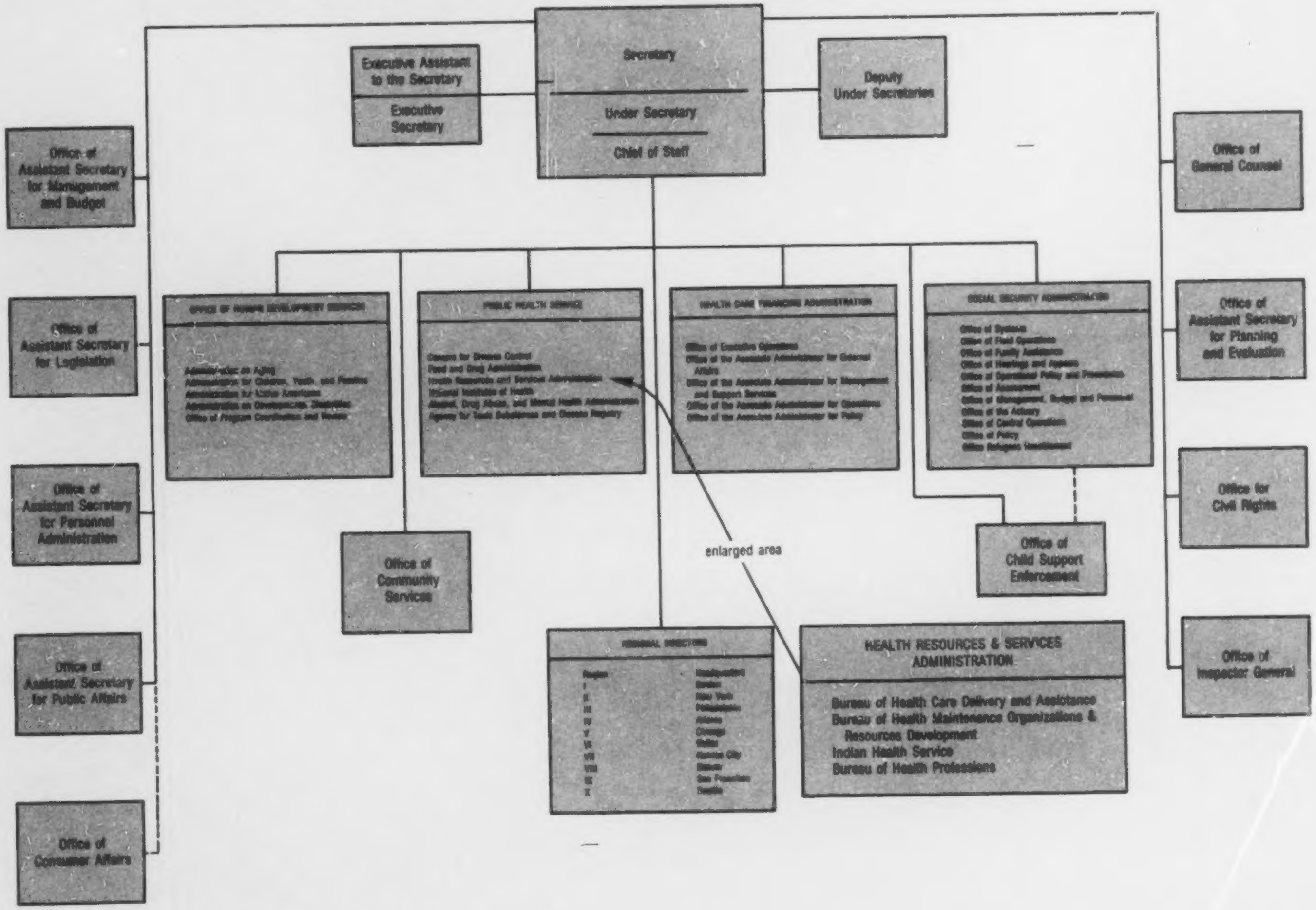
Federal responsibility for medical and health-related services was transferred in 1955 from BIA in the Department of the Interior to PHS in what was then the Department of Health, Education, and Welfare (42 U.S.C. 2004a). IHS is now located in the Health Resources and Services Administration (HRSA), one of five administrative units that comprise the Public Health Service in the Department of Health and Human Services (figure 1-4).

Services that are available through IHS include outpatient and inpatient medical care, dental care, public health nursing and preventive care, and health examinations of special groups such as school children (42 CFR 36.11). Within these broad categories are special initiatives in such areas as alcoholism, diabetes, and mental health. However, the actual availability of particular services depends on the area served. IHS regulations are very explicit on this point: "The Service does not provide the same health services in each area served. The services provided to any particular Indian community will depend upon the facilities and services available from sources other than the Service and the financial and personnel resources made available to the Service" (42 CFR 36.11[c]).

As previously described, direct care services are provided through IHS at its clinics and hospitals, including IHS and some tribally constructed facilities that are administered by tribes under the Indian Self-Determination and Education and Assistance Act of 1975 (Public Law 93-638; 25 U.S.C. 450, *et seq.*); and through contract services purchased from non-IHS medical care providers. Tribal administration most often involves primary care clinics and special programs such as alcoholism counseling and the community health representative program. Contracts with non-Indian providers usually involve specialty services and/or inpatient care not available through IHS's hospitals and clinics. In fiscal year 1985, out of a total appropriation of $807 million (excluding the facilities construction program), the clinical services budget was $637 million (figure 1-5). The remainder was spent on preventive health programs and other activities such as urban projects, manpower training, and administrative costs. Of the clinical services budget of $637 million, $164 million (26 percent) was spent on contract care, while $473 million (74 percent) was spent on direct care. Approximately $141 million (30 percent) of the direct services budget was administered by tribal programs under self-determination contracts. Thus, of the $637 million appropriated for clinical services in fiscal year 1985, direct IHS operations accounted for 52 percent, tribally administered programs accounted for 22 percent, and 26 percent was spent on contract care.

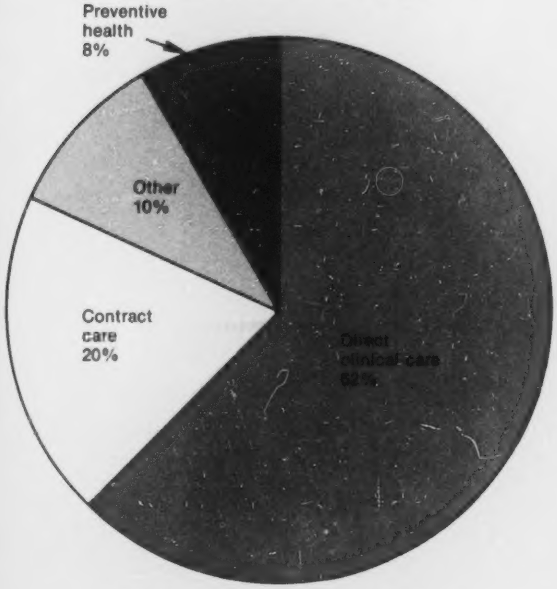
The organizational structure of IHS is depicted in figure 1-6. IHS facilities consist of 51 hospitals (6 are tribally administered), 124 health centers (over 50 tribally administered), and nearly 300 health stations (over 200 tribally administered). A health center is a relatively comprehensive outpatient facility that is open at least 40 hours per week, while a health station, which may be a mobile unit, is open fewer than 40 hours per week and offers less complete ambulatory services. IHS also maintains health locations, which generally are outpatient delivery sites (but not IHS facilities) that are staffed periodically by traveling IHS health personnel. The locations of IHS and tribally administered hospitals and health centers are depicted in figure 1-7.

Figure 1-4.—Organization of the U.S. Department of Health and Human Services


Secretary
Under Secretary
Chief of Staff
Executive Assistant to the Secretary
Executive Secretary
Deputy Under Secretaries
Office of Assistant Secretary for Management and Budget
Office of Assistant Secretary for Legislation
Office of Assistant Secretary for Personnel Administration
Office of Assistant Secretary for Public Affairs
Office of Consumer Affairs
Office of General Counsel
Office of Assistant Secretary for Planning and Evaluation
Office for Civil Rights
Office of Inspector General
OFFICE OF HUMAN DEVELOPMENT SERVICES
Administration on Aging
Administration for Children, Youth, and Families
Administration for Native Americans
Administration on Developmental Disabilities
Office of Program Coordination and Review
PUBLIC HEALTH SERVICE
Centers for Disease Control
Food and Drug Administration
Health Resources and Services Administration
National Institutes of Health
Alcohol, Drug Abuse, and Mental Health Administration
Agency for Toxic Substances and Disease Registry
HEALTH CARE FINANCING ADMINISTRATION
Office of Executive Operations
Office of the Associate Administrator for External Affairs
Office of the Associate Administrator for Management and Support Services
Office of the Associate Administrator for Operations
Office of the Associate Administrator for Policy
SOCIAL SECURITY ADMINISTRATION
Office of Systems
Office of Field Operations
Office of Family Assistance
Office of Hearings and Appeals
Office of Operational Policy and Procedures
Office of Assessment
Office of Management, Budget and Personnel
Office of the Actuary
Office of Central Operations
Office of Policy
Office Refugee Resettlement
Office of Community Services
Office of Child Support Enforcement
REGIONAL DIRECTORS
Region
I
II
III
IV
V
VI
VII
VIII
IX
X
Headquarters
Boston
New York
Philadelphia
Atlanta
Chicago
Dallas
Kansas City
Denver
San Francisco
Seattle
enlarged area
HEALTH RESOURCES & SERVICES ADMINISTRATION
Bureau of Health Care Delivery and Assistance
Bureau of Health Maintenance Organizations & Resources Development
Indian Health Service
Bureau of Health Professions

SOURCE: U.S. Department of Health and Human Services.

Figure 1-5.—IHS Allocations by Major Budget Category, Fiscal Year 1985



Total IHS Allocations FY 1985: $807 million

■ *Direct clinical care:* $498 million—includes budget lines for hospitals and clinics; dental, mental health, alcoholism programs; maintenance and repairs.

☐ *Contract care:* $164 million—services purchased from private providers.

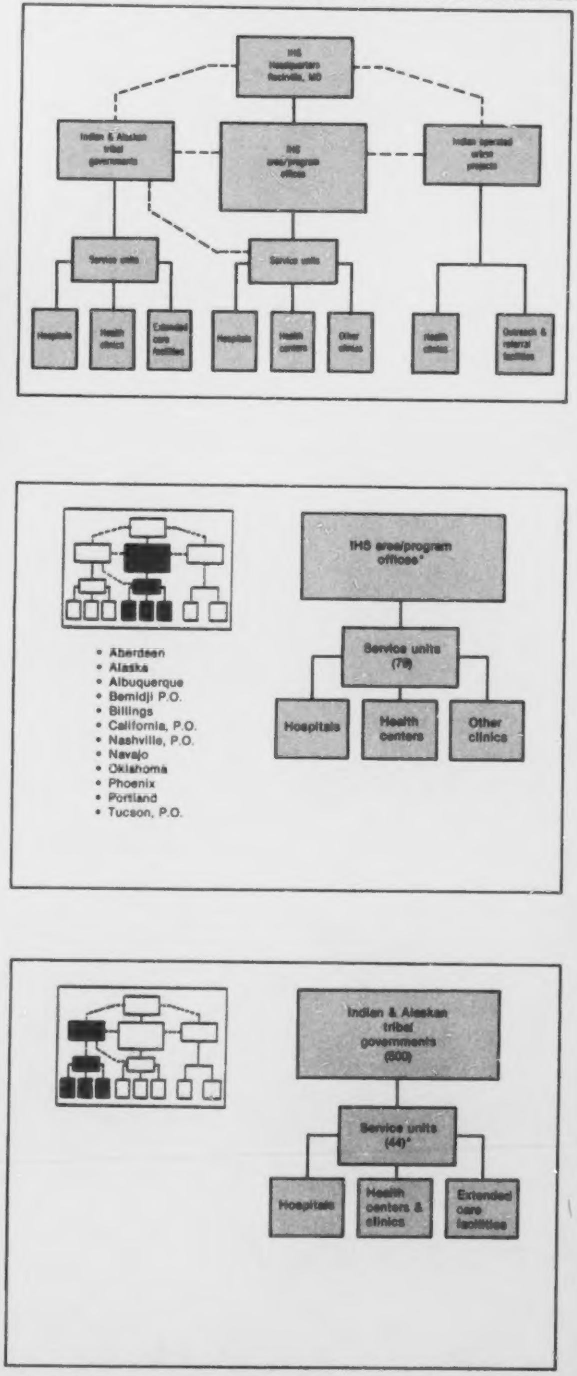
■ *Preventive health services:* $66 million—includes sanitation, public health nursing, health education, community health representatives, immunizations.

▨ *Other:* $79 million—includes urban Indian health projects, health manpower, tribal management, direct operations.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Administration and Management; fiscal year 1985 allocation including pay act funds, as of Sept. 26, 1985 ($1 million of appropriation held in reserve).

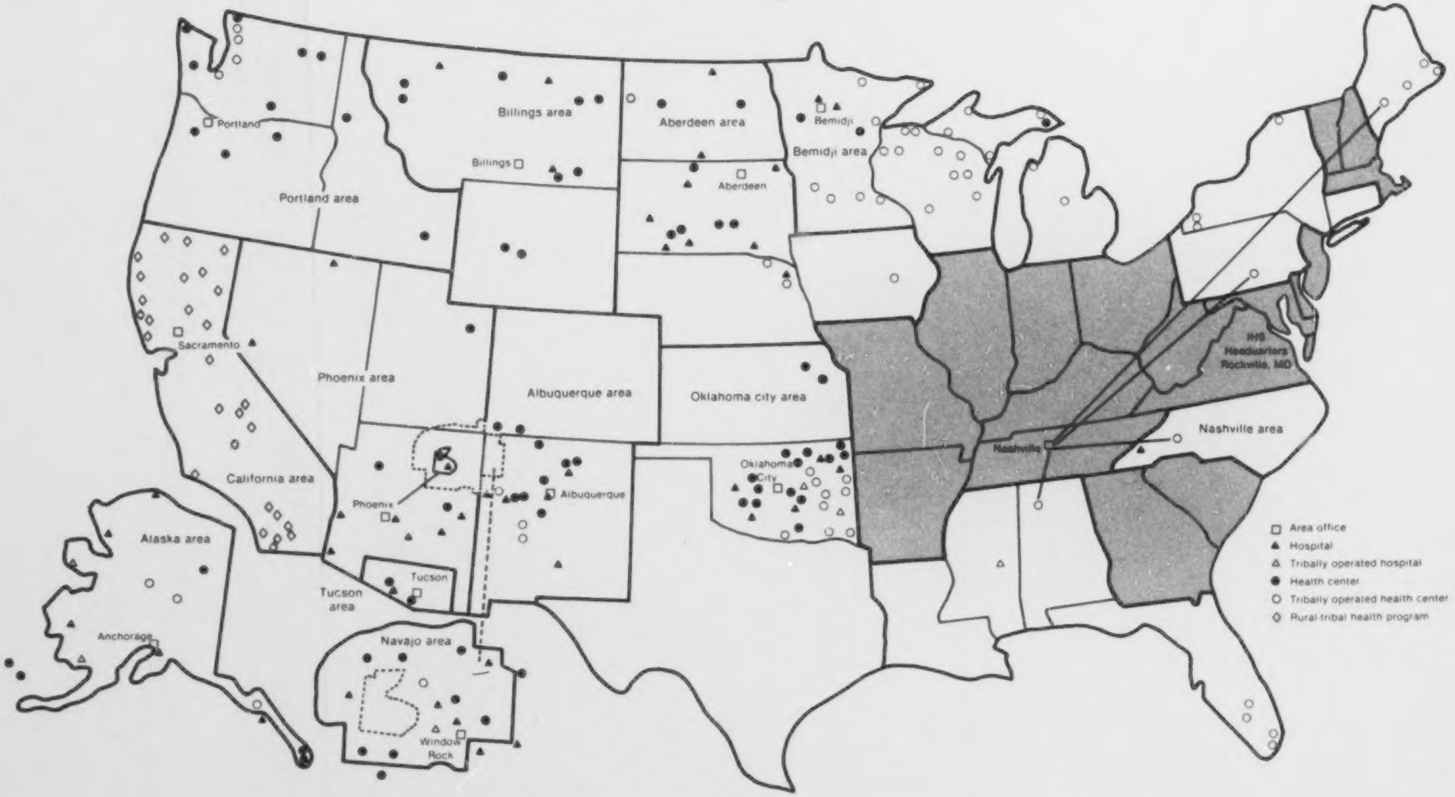
In 1984, IHS also provided full or partial funding for 37 urban Indian programs in 20 States. The urban programs' emphasis is on increasing access to existing services funded by other public and private sources for Indians living in urban areas. Only 51 percent of the urban programs' total 1984 budget of $17.5 million was provided by IHS. Since some funding sources require these programs to serve certain populations that include non-Indians, the only requirement that IHS imposes on the urban programs is that the number

Figure 1-6.—Indian Health Service DHHS/PHS/HRSA


IHS Headquarters Rockville, MD
Indian & Alaskan tribal governments
IHS area/program offices
Indian operated urban projects
Service units
Service units
Hospitals
Health clinics
Extended care facilities
Hospitals
Health centers
Other clinics
Health clinics
Outreach & referral facilities
IHS area/program offices*
Service units (79)
Hospitals
Health centers
Other clinics
• Aberdeen
• Alaska
• Albuquerque
• Bemidji P.O.
• Billings
• California, P.O.
• Nashville, P.O.
• Navajo
• Oklahoma
• Phoenix
• Portland
• Tucson, P.O.
Indian & Alaskan tribal governments (500)
Service units (44)*
Hospitals
Health centers & clinics
Extended care facilities

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *IHS Chart Series Book*, April 1985 (unpublished as charts 1.1-1.3, p. 7).

Figure 1-7.—Indian Health Facilities


Portland
Portland area
Billings area
Billings
Aberdeen area
Aberdeen
Bemidji
Bemidji area
Sacramento
Phoenix area
Albuquerque area
Oklahoma city area
California area
Phoenix
Albuquerque
Oklahoma City
Tucson
Tucson area
Navajo area
Window Rock
Alaska area
Anchorage
IHS Headquarters Rockville, MD
Nashville
Nashville area
□ Area office
▲ Hospital
△ Tribally operated hospital
● Health center
○ Tribally operated health center
◇ Rural-tribal health program

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, 1985.

of Indians served by each program be proportional to the amount of funds provided by IHS.

IHS hospitals are smaller than the average U.S. short-stay community hospital, with two-thirds of IHS hospitals having 50 beds or less, compared with about 20 percent of all community hospitals in that size group. Thirteen of 45 IHS-operated hospitals have 50 to 99 beds, and only 4 exceed 100 beds: Anchorage, Phoenix, Tuba City, and Gallup. Seven IHS hospitals have only 14 or 15 beds. The average IHS hospital is over 35 years old. Of the hospitals operated by IHS, 18 were built before 1940, 3 were built between 1940 and 1954, and 26 have been built since the transfer of Indian health services from BIA to IHS.

In general, an IHS hospital is likely to provide a relatively wide range of health-related and social support services, but few high-technology services. For example, only 13 of the 51 IHS and tribally administered hospitals offer staffed surgical services (5 of these are in Oklahoma), and an additional 7 hospitals offer modified or limited surgery (using part-time contract surgeons).

The fact that IHS hospitals are relatively limited in the services they can provide is one reason that the contract care program has been under increasing budgetary pressures. Furthermore, IHS does not maintain hospitals in all its service areas. In areas without IHS hospitals, inpatient services of all types, as well as specialty services, must be purchased from the private sector through the contract care program. IHS maintains referral hospitals in Phoenix, Gallup, and Anchorage for Indians in those areas. These referral hospitals in turn have their own contract care budgets for further specialized services that they cannot provide. California and the Pacific Northwest, on the other hand, have no IHS or tribal hospitals (there is actually one hospital that is physically located in California to serve the Quechan tribe, which is administered from the Yuma service unit out of the Phoenix area office) and must purchase all inpatient care with their contract care allocations. Except for the Mississippi Choctaw and North Carolina Cherokees, eastern Indians also are provided inpatient services almost entirely through contract care.

As described earlier, IHS is by regulation a residual provider. It will attempt to collect from other sources of payment for care provided in IHS facilities, and it will determine what other sources of financing are available before authorizing payment for contract care (in addition to the previously described eligibility criteria limiting contract care to Indians living on or near reservations). **In practice, other sources of payment are largely derived from Medicaid and Medicare, rather than from private health insurance, because of the low income of many Indian people (especially those who are reservation-based) and their lack of employment-related health insurance benefits.**

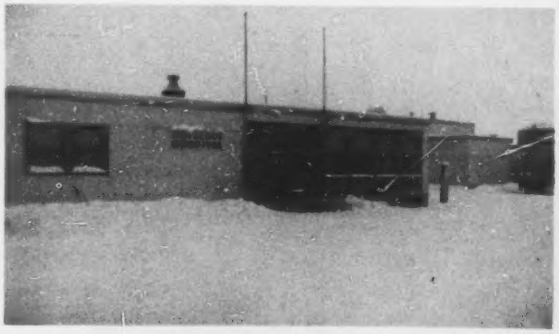


Photo credit: Indian Health Service

The 31-bed IHS hospital in Kotzebue, Alaska, constructed in 1961.

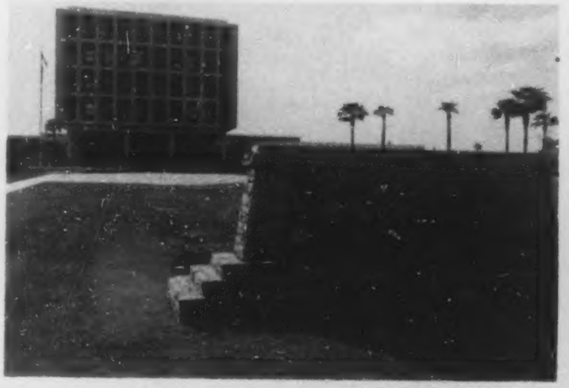


Photo credit: Indian Health Service

The 163-bed Phoenix Indian Medical Center, one of three referral hospitals in IHS.

Even when patients have private insurance, companies routinely refuse to pay for services provided in an IHS facility, because there is no obligation on the part of the insured Indian to pay. Through congressional amendments to the Social Security Act, IHS facilities are eligible for reimbursements from Medicare and Medicaid, with Medicaid payments to be made totally out of Federal funds, and with the revenues to be used to restore or keep the facilities and their services in compliance with the conditions and requirements of the Medicare and Medicaid programs. Indians may experience difficulties in maintaining their eligibility for Medicaid, however, if they are in the "medically indigent" category of medical beneficiaries. Unlike "categorically needy" beneficiaries already enrolled in public assistance programs who automatically qualify for Medicaid (e.g., Supplemental Security Income), the "medically indigent" must apply for and continue to maintain their eligibility through county Medicaid offices.

For those services that IHS (including tribally operated programs) does purchase under contract, there are no uniform criteria for payment levels among IHS area offices. Physicians and other health care providers (e.g., optometrists) are usually paid on a fee-for-service basis; hospitals charge their prevailing rates and often are paid 100 percent of the amount billed. Individual service units within area offices may be able to negotiate lower payment rates, but this is the exception and depends on such special factors as long-standing relationships between the IHS service unit and outside providers, and on the availability of a range of outside providers.

IHS has experimented only to a limited extent with other methods of services delivery. In southern Arizona, the Pascua-Yaqui tribe's outpatient and hospital services are provided through a prepaid arrangement with a health maintenance organization (HMO), financed through specially appropriated congressional funds. A similar demonstration is underway for the Suquamish tribe in Washington State with Blue Cross/Blue Shield, but the demonstration is being conducted on a fee-for-service basis initially to develop information on costs. In Oklahoma, the tribes served by the Pawnee service unit have been provided with a "benefits package" in lieu of a replacement hospital. Under this arrangement, general outpatient care is still provided through IHS clinics, but all other care is purchased from local providers at prevailing rates. The same limits (use of other resources first) are imposed on the Pawnee benefits package as are applied to IHS's contract care program. The HMO option is not available in the Pawnee service unit, because no HMOs exist there (or in many other IHS service areas). These examples illustrate the extent to which available alternate resources, and options in methods of paying for them, vary across the United States. As described earlier, similar variations in the availability of direct IHS services exist across IHS areas.

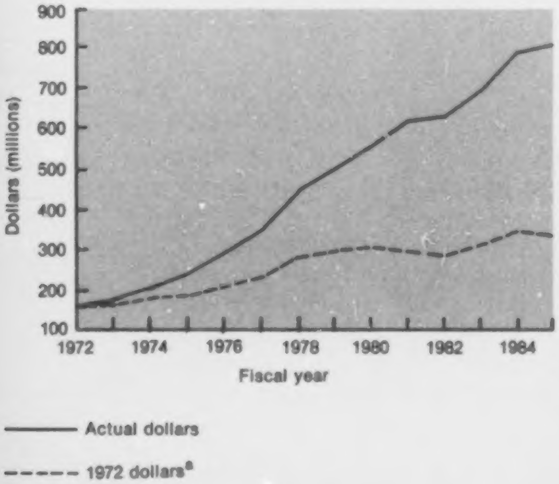
FEDERAL EXPENDITURES FOR INDIAN HEALTH CARE

Federal expenditures for Indian health care are of two types: Federal programs targeted at specific groups in the overall U.S. population for which individual Indians may qualify, and specific appropriations for Indian health services. The principal non-Indian health programs are Medicaid and Medicare. Other Federal medical service programs that serve some Indians include community health centers and the Veterans Administration's (VA's) medical care system, as well as medically related social programs such as the Women, Infants, and Children program. There is also the National Health Service Corps (NHSC) program, which currently provides a large proportion of the physicians practicing in IHS through the payback requirement for NHSC scholarships (those physicians' salaries are paid out of IHS funds).

Little information is systematically available on Federal, State, and private expenditures on Indians. The best information is on Medicaid and Medicare which are probably the largest non-Indian sources of expenditures, including State and private health insurance sources. However, the information on Medicaid and Medicare is limited to reimbursement for services provided in IHS facilities. In the contract care program, the Indian beneficiary must first exhaust other sources of payment before the contract care program will authorize care, but IHS does not keep track of the total costs of the care provided to Indian beneficiaries by non-IHS providers and only accounts for IHS costs for contract care patients.

Figure 1-8 summarizes IHS appropriations from 1972 to 1985 in actual and constant dollars. (Facility construction funds are provided in separate appropriations and are not included in the figure. In 1985, the appropriations for facilities totaled $61.6 million, which was spent on new and replacement hospitals, modernization and repair of existing hospitals, outpatient care facilities, grants to community facilities, sanitation facilities, and personnel quarters.) Adjusting for inflation, IHS allocations doubled between 1972 and 1985. However, IHS's estimated service population also doubled during this period (see figure 1-2), so that allocations per estimated IHS beneficiary have remained essentially the same when adjusted for inflation (figure 1-9).

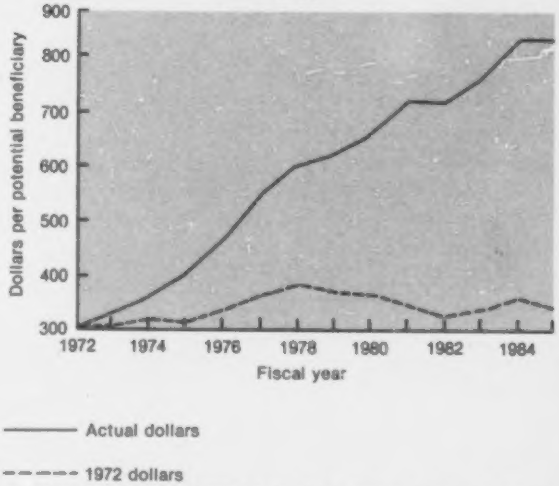
Figure 1-8.—IHS Total Allocations, Fiscal Years 1972-85



[a]1972 dollars obtained using OMB Federal non-defense deflators.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Resources Management Branch.

Figure 1-9.—IHS Allocations Per Potential Beneficiary, 1972-85



SOURCES: Allocations: U.S. DHHS, Indian Health Service, Resources Management Branch. Service Population: U.S. DHHS, Indian Health Service, Population Statistics Staff 1972 dollars obtained using OMB Federal non-defense deflators.

In fiscal year 1984, IHS was reimbursed $12.7 million from Medicare and $14.1 million from Medicaid for services provided to eligible Indians in IHS facilities. The Medicaid reimbursements are somewhat surprising in view of the impression OTA received during the course of this assessment that many more Indians should be eligible for Medicaid than for Medicare. One explanation may be, as IHS officials have reported, that collections from Medicare for services provided by IHS to Indians who also are Medicare beneficiaries proceed relatively smoothly. IHS has been reimbursed under Medicare's prospective hospital payment system since October 1983. Nor are contract care referrals a problem as long as the private provider is aware of the patient's Medicare eligibility and bills Medicare on behalf of that patient. **Collections from State Medicaid programs have been more difficult for both the IHS direct and contract care programs, primarily because of problems in ensuring that all Medicaid-eligible Indians are enrolled in the program. IHS must deal with different and changing Medicaid eligibility and coverage requirements in each State; and State Medicaid programs, which are under budgetary pressures of their own, have little incentive to encourage Indian enrollment.**

In the contract care program, some IHS areas have established their own manual or automated systems for identifying alternate resources. For example,[1] in the Portland area (which has no IHS hospitals), alternate resource utilization targets based on actual past collections have been established for each service unit and reviewed quarterly. The targets, which reflect differences in tribal population characteristics (especially age distributions) and the availability of other resources such as State Medicaid programs, range from an expected 30 to 50 percent of contract care charges that should be collected from non-IHS payers. These estimates apply only to the service units in the Portland area and are based on all alternate resources, not just Federal programs, but they are likely to be largely dependent on Medicaid programs.

HEALTH STATUS OF INDIANS

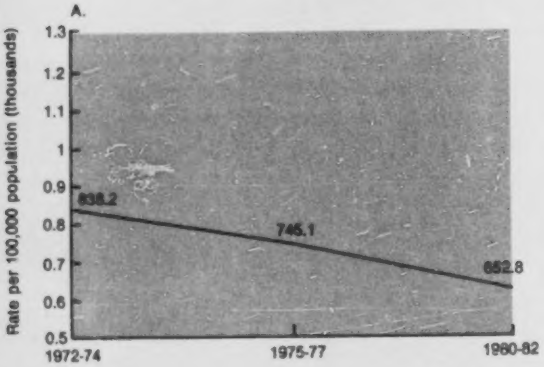
The overall health status of American Indians has improved substantially since IHS assumed responsibility for Indian health programs in 1955. The health of Indians is not yet comparable to that of the general U.S. population (all races), however, and national IHS figures mask wide variations in overall mortality rates and cause-specific mortality rates among IHS service areas. Moreover, analyses of the health status of American Indians and the effectiveness of IHS efforts to improve it are limited by substantial data inadequacies. Therefore, all health status data should be interpreted cautiously.

An overall improvement in Indian health is illustrated in figure 1-10, which shows a decline in the crude mortality rate for 11 IHS service areas (California is not included because of serious shortcomings in available data) for the decade between 1972 and 1982. Comparisons with U.S. all races data are not possible because of differences between the age distinction of Indians and other populations. Comparisons between IHS areas across time should be made cautiously because of changes in populations and area boundaries. However, as also shown in figure 1-10, the decline was far from uniform across IHS areas: the Portland area appears to have experienced the greatest decline, and the Billings area the least. In all IHS service areas, improvements in mortality rates for some conditions mask deteriorations due to other conditions. In Alaska, for example, reductions in death rates for suicide and infant mortality were counterbalanced to some extent by increased deaths from heart and liver disease. Improvement in Indian health is sometimes inferred from the fact that heart disease instead of accidents has become the leading cause of death for Indians and from data that show the pattern of Indian illness to be shifting from infectious diseases toward chronic diseases. This appears to indicate that Indians are living longer, but even heart disease is an affliction of younger Indians, and the number of deaths from accidents is almost as great as the number of deaths from heart disease. Moreover, it is important to realize that differences between Indian and U.S. all races mortality rates are primarily differences of degree; suicide and homicide were not among the leading causes of death for U.S. all races in the early 1950s (155), but they are now (201).

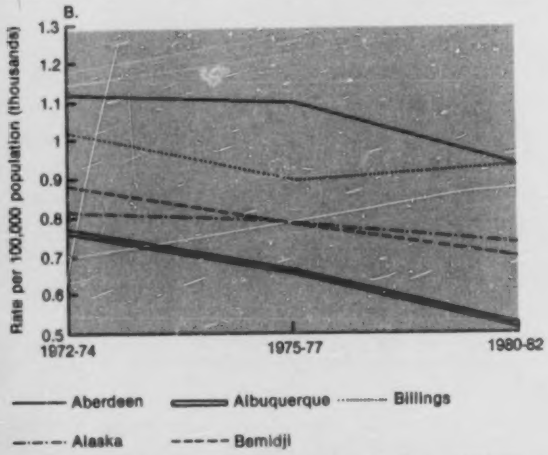
Despite general improvement, much of the Indian population residing in IHS service areas is in poor health relative to the rest of the United States. As shown in figure 1-11, **in the 3-year period centered in 1981 only one IHS service area, Oklahoma City, had an age-adjusted death rate that was below that of the U.S. all races population** (as explained above, information on the California service area is omitted because the data are too incomplete to support any conclusions).

Perhaps the most significant indicator of Indian health status is that Indians do not live as long as other U.S. populations. In the 3-year period centered in 1981, 37 percent of Indian deaths occurred in Indians younger than age 45, compared with only 12 percent of U.S. all races deaths occurring in that age group. Consistent with the mortality experience, almost three-quarters of IHS hospital patients in 1984 were under 45 years, compared with 48 percent of inpatients in U.S. short-stay, non-Federal hospitals being in that age

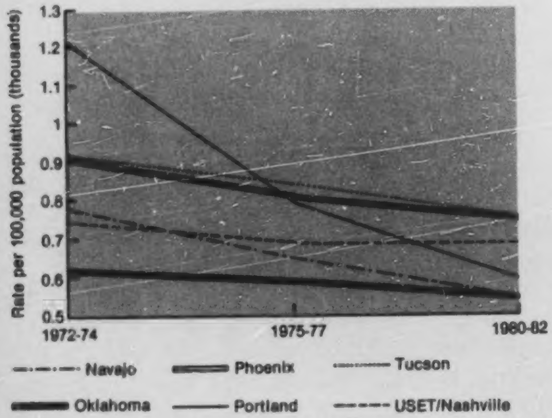
Figure 1-10.—All Areas Crude Mortality Rates All Causes, 1972-85



IHS Area Crude Mortality Rates All Causes, 1972-82

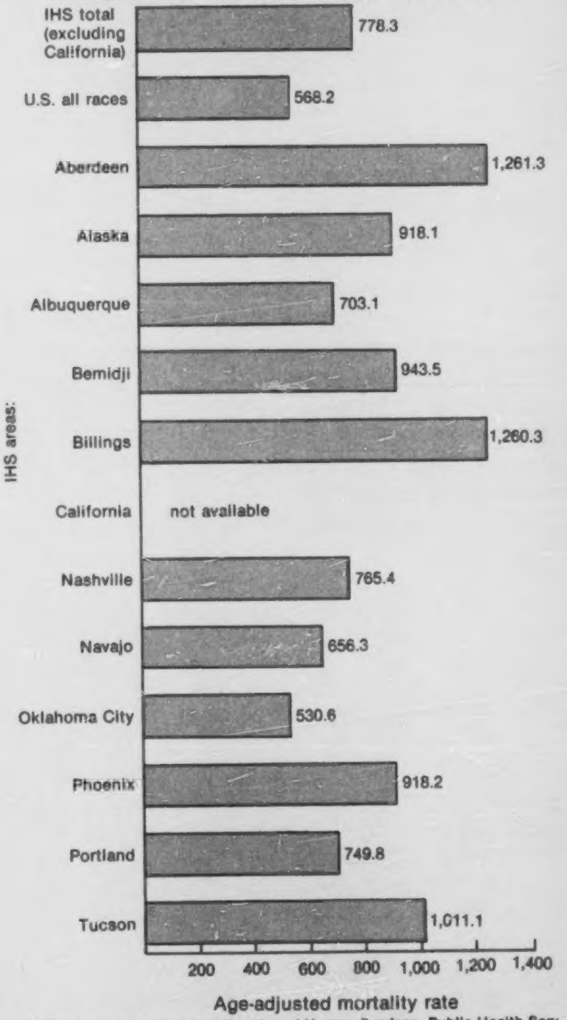


IHS Area Crude Mortality Rates All Causes, 1972-82



SOURCE: Office of Technology Assessment, based on Indian Health Service data.

Figure 1-11.—Age-Adjusted Death Rates: American Indians, 1980-82 12 IHS Areas: Both Sexes (rates per 100,000 population in specified group)



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

group. These differences in age distribution are explained primarily by the difference in causes of illness and death.

For the 1980-82 period, the average age-adjusted overall mortality rate for Indians residing in IHS service areas was 778.3 per 100,000, a rate 1.4 times that of U.S. all races. For females, the age-adjusted mortality rate was 578.7, or 1.4 times that of all U.S. females; for males it was 998.8, 1.3 times that of all U.S. males. **These figures differ markedly from those published by IHS,** because IHS averages all Indian deaths reported in all parts of each reservation State, whether or not IHS has service delivery responsibilities in those areas. In IHS's view, it is necessary to publish data in this way to show changes since 1955, when IHS took responsibility for Indian health but at which time IHS had not yet been structured into service areas. For the 1980-82 period, IHS calculated an average age-adjusted mortality rate for Indians of 568.9, which was essentially the same as that for the U.S. all races population (191).

The leading causes of Indian deaths in 1980-82 and their rates of occurrence compared to that of U.S. all races are listed in table 1-1, using first-listed causes of death.

For U.S. all races, accidents were the fourth leading cause of death. For all IHS service areas, accidents were the second leading cause of death, and in seven IHS areas, accidents remained the leading cause of death. **The accidental death rate for Indians in all IHS areas was 3.4 times that of the U.S. all races rate, and there was no IHS area that did not have a mortality rate from accidents at least 2.2 times greater than the U.S. rate.**

On average, Indian mortality rates due to cardiovascular diseases and cancer were lower than those for the U.S. all races population. However, death rates from heart disease exceeded the rate for the general U.S. population in four IHS areas: Aberdeen, Bemidji, Billings, and Nashville. In each of these four areas except Billings, heart disease was the leading cause of death. Cerebrovascular disease also was a leading cause of death in all IHS areas, and it exceeded substantially the U.S. all races rate in these same four areas plus Alaska. **Similarly, the mortality rate due to all types of cancer, which was the third leading cause of death in IHS's service population, exceeded the rate for the U.S. all races population in five IHS areas.** Some IHS areas have experienced high mortality rates for particular types of cancers, such as for cancers of the digestive system in the Aberdeen and Alaska areas.

Diabetes mellitus was the seventh leading cause of death in the IHS service population. During OTA field work for this assessment, medical

Table 1-1.—Leading Causes of American Indian Deaths and Age-Adjusted Death Rates for All IHS Areas (excluding California) (1980-82), Compared to Age-Adjusted Death Rates for U.S. All Races (1981)

			American Indian		U.S. all races	
IHS code[a]	Rank[b]	Cause name	Number of deaths	Age-adjusted rate[c]	Age-adjusted rate	Ratio American Indian to U.S. all races
ALL	. . .	All causes	15,321	778.3	568.2	1.4
310	1.	Diseases of the heart	3,058	166.7	195.0	0.9
790	2.	Accidents/adverse effects	2,946	136.3	39.8	3.4
150	3.	Malignant neoplasms	1,713	98.4	131.6	0.7
620	4.	Liver disease/cirrhosis	801	48.1	11.4	4.2
430	5.	Cerebrovascular diseases	664	33.8	38.1	0.9
510	6.	Pneumonia/influenza	580	26.6	12.3	2.2
260	7.	Diabetes mellitus	470	27.8	9.8	2.8
830	8.	Homicide	458	21.2	10.4	2.0
820	9.	Suicide	447	19.4	11.5	1.7
740	10.	Perinatal conditions	331	9.8	9.2	1.1
640	11.	Nephritis, et al	229	12.4	4.5	2.8
730	12.	Congenital anomalies	205	6.5	5.8	1.1
540	13.	Chronic pulmonary diseases	177	9.6	16.3	0.6
090	14.	Septicemia	122	6.5	2.9	2.2
030	15.	Tuberculosis	77	4.2	0.6	7.0
		All others	2,910	144.4	67.5	2.1

[a] Comparable to ICD-9 Codes; available from IHS.

[b] Ranked by number of deaths.

[c] Note that age and sex distributions are for reservation States and may or may not reflect age and sex distribution in IHS areas.

SOURCES: **U.S. All Races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):Supp., DHHS Pub. No. (PHS) 84-1120 (Hyattsville, MD: PHS, June 22, 1984); **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, 1985.

professionals in several IHS areas cited the rapidly increasing incidence of diabetes as a serious concern. Despite a 10-percent decline between 1972 and 1982 in crude death rates from diabetes, the age-adjusted mortality rates for Indians exceeded the U.S. all races rate in every IHS area but Alaska, where diabetes was not among the 15 leading causes of death. **The overall diabetes death rate for Indians in IHS service areas was 2.8 times the U.S. all races rate;** and in the Aberdeen IHS area, it was 5.2 times the U.S. rate. Kidney failure was one of the common sequelae of diabetes, and **deaths in the IHS population due to renal failure exceeded the U.S. all races rate by a ratio of 2.8.**

Pneumonia and influenza remain common causes of death among Indians. In the 3-year period centered in 1981, the category combining pneumonia and influenza was the sixth leading cause of death among Indians, as it was for U.S. all races. For Indians, however, the 1980-82 rate represented almost a 50-percent decline in deaths from pneumonia and influenza since 1972-74; yet it still was nearly twice the mortality rate for U.S. all races. In the Aberdeen area, the pneumonia and influenza mortality rate was almost four times the U.S. rate in 1980-82. On the other hand, Indian death rates due to chronic pulmonary diseases (the 13th leading cause of death) were below the U.S. all races rate, even when age-adjusted, for all IHS areas combined and in all individual IHS areas but two.

While suicide and homicide were the 10th and 11th leading causes of death for U.S. all races, they were the 9th and 8th leading causes, respectively, among Indians residing in IHS service areas. **The 1980-82 crude death rate due to suicide among Indians exceeded the U.S. all races rate by a ratio of 1.7.** There was only one IHS service area (Oklahoma City) for which the age-adjusted suicide mortality rate was lower than that for U.S. all races. **Furthermore, suicide tends to claim the lives of younger Indians: the Indian age-specific death rates for suicide exceeded those of the U.S. population for all age groups up to age 44, and in the 15 to 24 year age group, the Indian death rate was 3.2 times greater than the U.S. rate.**

The homicide mortality rate among Indians in each of the IHS service areas was greater than the U.S. all races homicide mortality rate. **On average, an Indian residing in an IHS service area was** 2 **[redacted] times as likely to die as a result of homicide than was a member of the general U.S. population.**

Infant deaths have declined since 1972 in the U.S. population at large and among Indians. In the 3-year period centered in 1981, however, infant mortality rates in the IHS service population exceeded the rate for U.S. all races in all but two of the IHS service areas (excluding California). The overall IHS infant mortality rate of 13.3 deaths per 1,000 live births in 1980-82 was 1.1 times the U.S. all races rate. When infant deaths are analyzed in more detail, it is the first year of life rather than the period immediately following delivery that is most dangerous for Indian infants. The IHS neonatal death rate (deaths occurring in the first month of life) was lower than that for U.S. all races (Indian neonatal death rates exceeded the U.S. rate in only two IHS areas), but death rates among Indian infants in the postneonatal period (from 1 to 12 months of age) exceeded the U.S. rate in all IHS areas but one.

Alcohol abuse is implicated in Indian deaths and illnesses from many causes, including accidents, suicide, homicide, diabetes, congenital anomalies in infants, pneumonia, heart disease, and cancer. A high prevalence of alcohol abuse can be inferred from the extremely high rates of death due to liver disease and cirrhosis of the liver in almost all IHS areas. In 1980-82, there were 801 deaths in which liver disease or cirrhosis was listed as the underlying (chief) cause. This represented an age-adjusted death rate among Indians of 48.1 per 100,000, which was 4.2 times the U.S. all races rate. **In one IHS area, the death rate from liver disease and cirrhosis was 10 times the U.S. rate, and there was no IHS area in which the Indian rate was below the U.S. rate.**

Mortality rates, of course, are not ideal indicators of a population's health status. A number of important health problems can be described only from epidemiologic surveys or patient care data. Used cautiously, IHS inpatient and outpatient utilization statistics may be applied to supplement an evaluation of Indian health status. For example, patient care utilization data indicate that otitis media is a severe problem among Indian

Photo credit: Indian Health Service

A community health nurse examining Indian children at home.

children. In 1984, otitis media accounted for 5.7 percent of all outpatient encounters for males in the IHS system, and 3.7 percent of the encounters for females. In the same year, the rate of hospitalization for otitis media in IHS and contract care hospitals was 18.0 per 10,000 population, compared with a rate of 12.8 per 10,000 in U.S. short-stay, non-Federal hospitals. This hospitalization rate reached 63.9 per 10,000 in Alaska.

There is considerable variability among IHS service areas and between IHS service population and U.S. all races rates in the relation between hospitalization and mortality rates. This is due only in part to the younger age distribution of American Indians and missing data and may indicate lack of access to services. Using U.S. short-stay, non-Federal hospitals as a benchmark, IHS hospitalization rates (in both direct and contract care hospitals but excluding two tribally run hospitals) generally were inconsistent with mortality rates for accidents and violence, circulatory system diseases, malignant neoplasms, alcohol-related conditions, diabetes, congenital anomalies, and conditions arising in the perinatal period. For all of these conditions except the last, average IHS hospitalization rates were low relative to cause-specific Indian mortality rates, although there were substantial variations among IHS service areas.

The example of the Portland IHS area may provide a partial explanation for the apparent lack of relationship between causes of death among Indians and cause-specific hospitalization rates. In the Portland area, IHS operates no hospitals and must purchase all inpatient care through the contract care program, which has been used in recent years to purchase only emergency and urgent care because of limited funds. The number of hospital discharges for the Portland IHS service population in 1984 was almost identical to the number in 1979, despite a 41-percent increase in the service population size. As a result, Portland area hospital discharge rates for most diagnostic categories were well below what might have been expected based on the mortality data. Limited IHS health services may have similar effects in reducing IHS hospitalization rates in the Bemidji, Nashville, and California service areas.

Hospitalizations for mental disorders have been declining in the IHS system more rapidly than in all U.S. short-stay, non-Federal hospitals, and mental health problems are not among the 15 leading reasons for IHS outpatient visits. One explanation for this finding is that many mental health and alcoholism treatment programs are tribally operated under self-determination contracts, and thus may not be included in IHS data reporting systems. However, mental health services are regarded by Indians and IHS area office staff as relatively unavailable in most IHS areas; alcohol treatment and prevention programs are also conceded to be inadequate to meet the need for them.

There is very little information on the health status of Indians living in urban areas, despite the fact that they constitute about 54 percent of the total Indian population. IHS does not collect much cause-specific patient care information from urban programs, nor does it analyze or publish vital statistics and population characteristics for urban Indians except when those data are included with national level data on the reservation States or included in service area data (some urban programs are located in IHS service areas).

Vital statistics for Indians residing in Standard Metropolitan Statistical Areas (SMSAs) were provided to OTA as part of the 1980-82 mortality data set. Thus, OTA was able to generate some death rate information on Indians living in urban areas. Because of the lack of age-specific Indian population data for urban areas, however, OTA was not able to generate age-adjusted rates. Mortality rates for Indians in urban areas therefore may be compared only with the crude death rates for other Indian populations, or with crude death rates of the total population of particular urban areas; they should not be compared with U.S. all races age-adjusted rates, the standard of comparison generally used in this report.

On average, Indians in urban areas have essentially the same pattern of causes of death that is found in IHS service areas. The leading causes of death for Indians in urban areas were: 1) diseases of the heart; 2) accidents, particularly motor vehicle accidents; 3) cancer; 4) liver disease and cirrhosis; 5) cerebrovascular diseases; 6) homicide; 7) diabetes mellitus; 8) suicide; 9) pneumonia and influenza; and 10) conditions arising in the perinatal period.

MAJOR ISSUES IN FEDERAL INDIAN HEALTH POLCIY

Eligibility and Entitlement

Federal-Indian relationships historically developed between the Federal Government and individual tribes or groups of tribes. Current relationships are based primarily on this cumulative experience and not on any relationship between the Federal Government and some type of "United Nations" of all tribes. Thus, there is tremendous variability in eligibility, ranging from tribes with land-based reservations, to tribes that have retained close social and cultural ties among its members but who no longer have a significant land base, to Indians who may or may not be members of a tribe but who retain access to Federal benefits because they are descendants of previous beneficiaries.

To be eligible for IHS direct services, a person need only be of Indian descent and be regarded as an Indian by the community in which he lives as evidenced by factors in keeping with general BIA practices. To be eligible for services not available within IHS's direct care system and which therefore must be purchased through contract care, there are the additional requirements that the potential patient: 1) actually reside "on or near" a federally recognized tribe's reservation, which has been generally defined in the regulations as consisting of the county(ies) containing or adjacent to the reservation (contract health services delivery areas, or CHSDAs); and 2) be a member of the tribe served or be recognized by the tribe as having close economic and social ties with it. Thus, the current IHS system is keyed to reservation-based Indians, but any Indian is eligible at least for IHS direct services. There are, of course, practical constraints in taking advantage of the IHS system, such as the physical location of IHS facilities and limits on available resources, which may mean a long wait for elective care.

Currently, individual Indians need not register with IHS prior to seeking care. IHS estimates its service population through the use of census data for counties meeting the CHSDA criteria, that is, for the same geographic areas in which Indians must live to qualify for contract care. (This situation is not unlike the VA medical care system, in which all veterans are potentially eligible for VA care. Veterans must show proof of their eligibility when seeking care, as do Indians for IHS care, and there is no preregistration requirement in either system. The VA, however, does have a priority system that favors veterans with service-connected disabilities, indigent veterans, and veterans over 65 years of age.)

Toward the end of 1985, IHS was considering three changes in its eligibility policies: 1) using a registration system started in January 1984 to obtain more accurate accounting of IHS's service population instead of relying on census-based population estimates; 2) combining eligibility criteria for direct and contract care so that a potential IHS patient must reside in defined geographical areas; and 3) imposing a minimum Indian blood quantum requirement of one-quarter for members of federally recognized tribes and one-half for other Indians. According to IHS, combining eligibility for direct and contract care would make IHS a single rather than a dual system of care. A minimum blood quantum requirement is being considered because the present descendancy provision means that the eligible population is and will continue to grow much more rapidly than IHS appropriations. **Limitations on eligibility are being proposed by IHS to engage Congress and the tribes in debate on the issue of budget pressures, which must be addressed either by increasing funds, cutting services, or limiting eligibility** (51,99).

The registration system is a reasonable step in determining who among the self-identified Indians in the U.S. Census are not only eligible for IHS services but also may reasonably be expected to make use of such services. The registration system should also contribute to resource allocation decisionmaking (discussed in the next section), which, as one of its basic parameters, requires an accurate count of the Indian population that IHS serves. However, use of the registration system as a factor in determining an IHS service area's budget would have negative effects in areas that have not yet reached many members of the eligible population, as might be the case for recently recognized tribes. These effects will be greater if the registration system is directed only at those patients who are actually treated, instead of advertising and promoting the need to register with IHS regardless of any immediate need for medical care. Thus, **if the purpose of registration is to obtain a better account of IHS's actual and potential user population, and not another means of restricting eligibility, it would be reasonable for IHS to implement its registration system over a few years and to take active steps to register eligible Indians.** After this initial enrollment period, IHS could then operate like a typical health insurance plan. For example, IHS could limit services to enrollees, with open enrollment periods every year and provisions for emergency care for patients who would have been eligible for services had they been enrolled.

Combining eligibility for direct and contract care may not have a large impact on IHS's present clientele. IHS already estimates its service population to be Indians living in essentially the same geographic areas that determine who is eligible for contract care. Currently, eligibility for contract care is further limited to tribal members and other Indians who are officially recognized by the tribe as having close economic and social ties with it. Indians not living in the specified geographic areas would be adversely affected by this proposal, but Indians living in these geographic areas and not members of the tribe(s) served by the local IHS facility would no longer have to prove that they have close economic and social ties with the tribe(s).

A minimum blood quantum requirement for eligibility would be extremely controversial, not only because of the racial overtones if the Federal Government rather than a tribe imposes it, but also because it would be seen as an encroachment on the authority of tribal governments. Representative of this view is the statement of one tribal chairman that "blood quantum eligibility for IHS patient care should be set by individual tribes as to correlate with tribal standards for tribal enrollment" (6).

In sum, IHS is proposing to restrict eligibility by defining where Indians can live and still be eligible for IHS services, and by establishing a minimum Indian blood quantum requirement of one-quarter for members of federally recognized tribes and one-half for other Indians. Alternatives to this approach include:

Option 1: IHS or Congress could develop a priority system for access to IHS services.

Rather than excluding whole categories of currently eligible Indians, IHS or Congress could develop a priority system similar to the one that exists in the VA medical system. For example, the IHS proposal could be modified by giving priority in descending order to: 1) tribal members who live on or near the reservation; 2) members of the Indian community who have close economic and social ties to the tribe; and 3) all other currently eligible Indians.

Option 2: IHS or Congress could use blood quantum criteria to supplement rather than restrict eligibility criteria based on tribal membership.

One such approach could be to specify that Indians eligible for IHS services would consist of members of federally recognized tribes without a blood quantum requirement, plus descendants of members of federally recognized tribes who were at least one-quarter Indian blood. The latter category may grow in importance as tribal members increasingly marry outside their tribes, because their descendants may be ineligible for membership in any specific tribe if they do not have the minimum tribal-specific blood quantum required for tribal membership, even if their degree of total Indian blood remains high.

An unresolved issue in this option is the variation among tribes in the use of blood quantum to determine membership. Many tribes have a minimum tribal-specific blood quantum requirement for membership, the most common being one-quarter or more, but there are many tribes that only require members to be descended from a member. (There are variations even in descendancy requirements, e.g., membership only through maternal lineage.) While tribes and Indian people in general are understandably very sensitive to the issue of blood quantum, this promises to be an increasingly divisive issue in the future as tribes with only descendancy requirements grow much more rapidly than tribes with some type of blood quantum requirement.

Of course, the IHS initiative to limit services to persons with at least one-quarter Indian blood is directed at this issue, but as already noted, it clashes with tribal political authority. A partial solution may be found by examining what membership means for tribes that have descendancy rather than blood quantum requirements. Some tribes have several categories of membership, with the lesser categories not eligible for all rights of tribal citizenship (e.g., voting or receiving occasional per capita payments from tribal enterprises). These special membership categories may have been established so that the larger tribal community could receive Federal services from BIA and IHS. Thus, **"membership" for the purposes of IHS eligibility could be defined as including only those members of a tribe who have the right to participate in all political and economic activities of the tribe.** By linking eligibility for IHS services only to those members who have the power to determine who controls the tribal government, there should be a built-in incentive for tribes to be conservative in their membership criteria. This may even be the case for tribes with only descendancy as a requirement for full membership. These tribes are aware of the increasing difficulties in both tribal governance and preservation of their resources because of their descendancy provisions, and may feel compelled to move in the future toward more conservative criteria for tribal membership.

Option 3: If eligibility criteria are made more restrictive, Congress could make IHS services less a residual source of care and more an entitlement program.

The proposed IHS restrictions on eligibility are based on limiting services to members of federally recognized tribes and other Indians who live on or near reservations. Thus, there would be a closer link between Federal health benefits and the government-to-government relationship between the Federal Government and Indian tribes. If this is the direction that Federal policy follows, then it is reasonable to argue that health care should become an explicit part of the trust responsibility. The legal relationship between the Federal Government and Indian tribes, in which there are presently no trust rights for Indian health care, is no impediment. **Congress has the power to decide whether or not health services should be part of the Federal trust responsibility. All the courts have said is that it is Congress's option to provide health services to Indians as a discretionary or guaranteed benefit.**

The current position of IHS is that it is a residual payer to other resources available to its service population. Congress could change this situation and establish a trust fund similar to that for Medicare, thereby providing an entitlement health care program for Indians. Alternatively, Congress could continue with yearly appropriations but establish a more comprehensive services package for eligible Indians, such as those long available to military personnel and their dependents, and to veterans. The Defense Department and the VA purchase services that are not available in their own medical care systems from the non-Federal sector for their members and dependents (10 U.S.C. 1071-1090; 38 U.S.C. 601-654). The military and VA contract health programs are much more generous than IHS's contract care program. They provide a wider range of benefits and will approve contract care when it is difficult to reach a military or VA facility, in addition to purchasing care not available in these facilities. In contrast, eligibility for IHS's contract care program is limited to Indians living in the general vicinity of Indian reservations and expressly excludes Indians who do not live nearby. Thus, Federal programs for special populations already exist that can serve as models for providing vested or more reliable and comprehensive sources of care than are currently provided to Indians.

This approach could be used to help support specific policies. For example, one policy might be to limit IHS services to tribal members but to preserve tribal sovereignty by not dictating to the tribes who among their members would be entitled to services (the IHS proposal would limit eligibility to tribal members who had a minimum degree of Indian blood of one-quarter). If eligible Indians had to use specified non-IHS providers when IHS direct services were not available, such as an HMO, tribal members who live far away from the reservation would have difficulty in making use of services, but IHS would not have to dictate to the tribes who among their members would be IHS-eligible. In contrast, a Medicare-type insurance policy could be used anywhere. The availability of services through HMO-type organizations obviously varies tremendously and may not be available in many parts of the country where IHS provides services, but it could be IHS policy to seek out and encourage these types of organizations.

Resource Allocation and Scope of Services

IHS has traditionally allocated its appropriations among its 12 service areas through a "historical" or "program continuity" budget approach. Thus, each area could expect to receive its recurring base budget from the previous year, plus an increase in mandatory cost categories (e.g., personnel cost-of-living and relocation expenses, supply cost increases) equal to the percentage increase in those categories awarded to the overall IHS program. This method of allocating resources was challenged in the 1970s in the *Rincon* decision (described above). The court criticized the historical budgeting approach, found that IHS was obligated to provide health services to Indians in California that were comparable to those offered Indians elsewhere in the United States, and determined that IHS was obligated to allocate its limited resources equitably by the consistent application of reasonable distributive standards.

IHS proposed using an equity fund to be allocated by a needs-based formula as its means of achieving comparability among the tribes. For fiscal years 1981 to 1984, the congressional appropriations committees earmarked about 1.3 percent of the total IHS health services appropriations annually for an Equity Health Care Fund, or about $7 to $9 million per year. Indians in California received about 35 percent of this amount. Although Congress did not earmark equity funds in fiscal year 1985 appropriations, IHS set aside $5 million of its appropriations, as it has a continuing obligation to reduce these funding disparities.

For fiscal year 1986 appropriations, IHS planned to apply an equity-based formula to any funding increases (including mandatory budget category increases) over the 1985 area base budgets. In addition, the population figures for each area were to be based on the patient registration system (begun in January 1984) rather than on the census-based estimated eligible service population.

The effects of the equity funds are cumulative. Equity awards become part of the recurring base budget and thus are guaranteed in future years as long as overall IHS allocations continue to cover the increase. These equity awards can have a significant impact on upgrading services, particularly among small tribes, where the increase can represent significant additions to their previous budgets. New equity funds, however, continue to represent less than 2 percent of the total IHS services budget and do not play a major role in the overall IHS budget allocation process, which continues to be driven by the historical funding approach.

The larger issue of **a more equitable distribution of the overall IHS clinical services budget has been a topic of discussion for years, and tribes throughout the United States increasingly have pressed for a resolution of the matter.** For example, the Navajo Tribal Council passed a formal resolution in response to this OTA assessment, calling for "the consistent application of reasonable distributive standards," through the use of "a set of economically and epidemiologically-based formulae" which take into account "the continually changing health conditions of the various tribes, shifts in the geographic distribution of eligible Indian beneficiaries, and regional differences in the availability of alternative health care delivery systems" (120). The Northwest Portland Area Indian Health Board made suggestions along similar lines, identifying the key points in resource allocation as including population, the benefits package provided, the alternative resources available, and cost differentials between IHS areas (95).

There are major impediments to the development of a redistribution formula for the total IHS clinical services budget that would be generally accepted by most parties. These impediments include: 1) lack of agreement on what constitutes the eligible population; 2) differences in the degree and type of services currently available in IHS service areas; and 3) questions on the validity of the data that would be used in applying a reallocation formula.

IHS uses estimates of its eligible population that are based on the most recent census data, adjusted by birth and death statistics. Under a historical budgeting system, the accurateness of these estimates was not crucial, since the budgets would not have been adjusted for per capita differences in funding between IHS areas. The patient registration system initiated in January 1984 will provide more reliable information on eligible and potential users for resource allocation purposes, but if it is applied before adequate efforts have been made to seek out and register eligible Indians, it could reward areas with high use or successful enrollment efforts while penalizing areas with unmet need. Several areas already are operating under severe budget restrictions, especially in the contract care program. Present patterns of use in those areas do not reflect need, and the expressed demand for services is also likely to be artificially low because of these restraints.

In addition, there is the larger underlying question of who is (or ought to be) an Indian for the purpose of eligibility for IHS services. This controversy includes the descendancy versus blood quantum requirements discussed in the previous section, and the status of Indians in terms of Federal recognition. The descendancy issue surfaces most often when the Oklahoma area is discussed, because of the common belief among Indians elsewhere that many of the users of IHS services in Oklahoma may be descended from Indians but are only nominally Indians. The Federal recognition issue is most applicable to the California area, where tribes have a bewildering mixture of different types of recognized and unrecognized status, largely because of past government policies. The California area, then, would also be immersed in controversy over the number of Indians who are eligible for IHS services.

The scope of services available in IHS areas is not uniform. Thus, before funds are redistributed, there has to be agreement on how these differences should be factored into any redistribution formula. One criterion for redistributing resources that has been suggested and examined by IHS is the availability of alternate resources. In fact, the method that IHS has developed to distribute its equity funds subtracts these alternate resources in calculating area funding needs. This policy penalizes areas that make the most efficient use of their IHS funds and provides built-in incentives not to be too aggressive in third-party collections. On the other hand, this policy could have the effect of shifting more funds to areas heavily dependent on contract care. In the contract care program, efforts are made to have other resources pay first before contract care funds are authorized. Since the contract care program does not actually collect money from these other sources, areas heavily dependent on contract care would not have these payments subtracted from their budgets.

There are serious deficiencies in most of the health data on Indians, including data on their health status and their use of IHS and contract care services. This has been a problem for OTA throughout this assessment, and much of the data we have provided has had to be qualified in terms of its completeness and accuracy. Nevertheless, OTA has provided its best estimates of such indicators, because much of this information is not readily accessible. It is hoped that the information provided in this report will serve as a common starting point for negotiations among Indian tribes, Congress, and IHS on equitable methods of resource allocation.

Option 4: Continue with the modest, incremental approach to resource redistribution that IHS has implemented.

An equity fund, whether provided through earmarked congressional appropriations or through a set-aside by IHS of a small portion of its appropriations, **is the least controversial method to implement, but it has only a modest impact.** Past and current redistribution decisions have been applied only to increases in IHS appropriations. This impact could become more substantial if budget reductions, instead of increases, are made by Congress as part of its overall efforts to reduce the Federal budget deficit, and if IHS became more assertive in decreasing some area budgets instead of trying to minimize the impact of the reallocation process.

At the end of 1985, IHS area directors had agreed to reserve any funding increases over the level of the 1985 base budgets, including mandatory budget category increases, for special distribution by an equity-based formula. In the first year of this potential distribution, however, no area would receive less than its 1985 funding (214). Thus, while the principle of the equity approach has been accepted by IHS area directors, it remains to be seen if it will be accepted and implemented if additional funds are not available and, instead, budget reductions must be made.

Congress could make this incremental approach mandatory either through earmarking of part of the annual appropriations, or through legislation specifying the percent of IHS appropriations that should be subject to reallocation.

Option 5: Accelerate the rate of reallocating funds among IHS areas.

The general approach taken by IHS could be implemented on an expanding basis, with the proportion of reallocated IHS funds increasing from one year to the next. This approach could also be implemented either through earmarked appropriations or through legislation. However, such a move would be much more controversial than the present, modest reallocation, and greater discussion and consensus on the criteria for redistribution would be needed by the tribes and IHS area offices.

Option 6: Work toward a common minimum services package for all IHS areas.

A different approach that is not entirely directed at gaining funding equity among IHS service areas would be to focus on the services that are available to the individual Indian beneficiary. A principal objective in equity funding is to ensure that eligible Indians everywhere have access to care that is appropriate to their needs. But equity in the sense of relative need may prove to be an elusive concept, considering the complicated factors that have been identified as essential parts of the formula, and the necessity of having to convert these complicated factors into monetary amounts.

Equity can also be viewed in terms of access: **if eligible Indians in all IHS service areas generally have access to the same types of services, much of the dissatisfaction over the present allocation of resources might be muted. A common services package would have to include both direct and contract care services for two reasons: 1) to neutralize the present disparity between IHS areas in the mix of direct and contract care services available, and 2) to ensure that eligible Indians in all areas have access to the same range of services.** A common services package is probably best accomplished by limiting access to non-IHS providers. For example, instead of paying for care from any non-IHS provider, services could be limited to designated non-IHS providers on a prepaid basis, such as HMOs where available.

Availability and Adequacy of Resources

IHS provides ambulatory and hospital care and purchases services not available at IHS facilities. In some areas, only ambulatory care is provided directly, either through IHS or tribally administered clinics. There are also a few demonstration programs in purchasing all care from outside providers, such as the Pascua-Yaqui HMO mentioned earlier. Those demonstration programs reflect the variability around the United States in the availability of alternative methods of providing and financing health services, and also indicate the basic changes that are occurring in the United States' health delivery systems.

Approximately 26 percent of the IHS clinical services budget is spent on contract care. **Despite the policy that alternative resources must be used first, many IHS areas have had to limit the use of contract care to emergency and urgent cases.** Furthermore, a few high-cost cases can quickly deplete a service unit's contract care budget, and several area offices have set aside a portion of their contract care dollars in a contingency fund for such events. In the 1984 Indian Health Care Improvement Amendments that were vetoed by President Reagan, Congress had addressed this problem by establishing a $12 million revolving fund for high-cost contract care cases (the "Catastrophic Health Emergency Fund") that would pay for contract care cases once a threshold of between $10,000 to $20,000 had been exceeded. The adequacy of this proposed fund was examined by OTA in detail, and the results of our analysis are summarized later in this section.

Several factors suggest that IHS will become increasingly reliant on the contract care program. The present IHS and tribal network of hospitals and clinics is limited in the types of services it can provide, and budgetary limits increasingly restrict new facilities construction, the replacement of old and inadequate facilities, and needed maintenance and repair of existing facilities. Diagnostic and therapeutic equipment purchases are limited, further reducing service capabilities. This limitation is due to the overall Federal budget situation and in part to the practical limitations of delivering comprehensive and specialty services to many widely dispersed, small populations.

Perhaps the most critical factor that in the near future may orient IHS away from direct care to greatly increased contracting is the growing problem of how to recruit and retain adequate medical staff. IHS depends on the PHS Commissioned Corps and on the service payback obligations of NHSC trainees for many of its physicians, nurses, and other medical and administrative staff. The Commissioned Corps is not a growing resource. The NHSC program is being eliminated, and the last trainees will be available to IHS in 1990. If

IHS staff positions cannot be filled, IHS will have to turn to the services of private providers, where they exist, under the contract care program.

High-Cost Cases in the Contract Care Program

"Catastrophic health costs" usually refers to the devastating financial effects that extremely costly and long-term illnesses can have on individuals who may have no insurance or who may be inadequately insured. Catastrophic costs most often are defined in terms of out-of-pocket costs to individuals that exceed a certain percentage of individual or family income, or as total costs per case in the range of $20,000 to $25,000 and above. In the IHS contract care program, the costs of catastrophic illnesses not covered by other payers are borne by IHS, not by individual Indians (although there may be cases that are disputed between IHS and another payer as to whom is the responsible party, leaving the individual Indian caught between the two). **The discussion of catastrophic costs in the IHS contract care program, therefore, has revolved around the idea of a limit for individual service unit obligations to be set somewhere between $10,000 and $20,000 per case, with costs over this threshold to be covered by a special revolving fund.** This fund, as explained above, would have been set at $12 million.

The data that OTA was able to obtain on the types, incidences, and costs of these cases were incomplete and poorly identified. Thus, it was not possible to determine from the available data whether what is called a problem of catastrophic care is in fact a problem of excessive incidences of catastrophic conditions in the Indian population, or whether it is more properly described as a budget management problem. Nor was it possible to consider alternative financing arrangements for these cases because of the lack of actuarially reliable data and the relatively small number of cases identified (i.e., small in terms of basic insurance principles on risk-spreading). Nevertheless, the data were sufficient to reach the following conclusions.

Based on the 1983 high-cost case experience in IHS, if the threshold was set at $10,000 per case, at least $5.5 million of the $12 million fund would have been needed to cover IHS contract hospital expenditures alone. Areas with higher average costs per case, such as Alaska, could expect the most relief. Some areas, such as California and perhaps Bemidji, would not benefit from the special fund, because they presently cannot afford to spend up to the threshold figure to qualify for the fund.

If the threshold was set at $15,000 per case, total outlays would have been a minimum of $3 million, and 2 of the 10 (of 12) IHS areas in the 1983 data set would not benefit at all. A $20,000 threshold per case would require outlays of about $1.2 million and assist only 4 of 10 areas. Including estimated nonhospital costs (physicians' fees, lab work, etc.) of from 16 to 30 percent of the hospital costs, the $12 million fund still would have been adequate in 1983 whether the threshold was set at $10,000, $15,000, or $20,000.

Problems in identifying high-cost case records to make up the data sets used in this analysis suggest that undercounting of cases may be considerable. Furthermore, the effects of health cost inflation could be substantial. For example, the 1983 data set included 524 cases, and there were originally 390 cases identified for 1984. When the 1984 billing file was searched again in October 1985, 746 high-cost case records were found. Since the data set identified any cases that cost the contract care program $10,000 or more, it might be expected that the number of cases would increase significantly from year to year from cost inflation alone. Thus, there is justifiable concern whether a $12 million fund would be adequate for very long.

Conclusion.—A high-cost care fund to spread the financial burden of high-cost contract care cases among all IHS service areas is a reasonable approach, whether those funds are derived from additional, earmarked appropriations or set aside from overall contract care funds. However, the fund would not assist IHS service areas that are not able to pay for contract care up to the threshold (between $10,000 and $20,000 per case) before the fund becomes available. **If the high-cost care fund is financed by setting aside a portion of contract care funds instead of from additional appropriations, IHS service areas that would not**

benefit from the fund could be exempted from having a portion of their contract care allocations redirected to the high-cost fund. For those service areas that would benefit from the high-cost fund, different thresholds to trigger eligibility for funds could be considered, since a common threshold would clearly favor a few areas over others. Finally, high-cost cases seem to be a budget management problem in the contract care program rather than a problem of excessive occurrences of catastrophic conditions. The possibility of incurring high-cost cases has led several IHS service areas to set aside a portion of their contract care funds. This practice can lead to severe rationing of contract care early in the fiscal year, followed by accelerated spending at the end of the year if the expected high-cost cases did not materialize. One method to alleviate this situation is to give IHS the authority to carry over a portion of its contract care appropriations into the next fiscal year (see option 8 below).

Options To Improve the Cost-Effectiveness of the Contract Care Program

Given expected rates of increase in general health care costs relative to likely IHS budget increases, even the most efficient management techniques will not be able to overcome the problems of inadequate funding and a growing service population in the IHS contract care program. However, the following options could help to mitigate some of the financial problems.

Option 7: Negotiate payment rates with contract care providers instead of paying 100 percent of billed charges, and impose a rate structure on IHS contractors, such as use of Medicare DRG (diagnosis-related groups) rates.

IHS could negotiate more aggressively, wherever possible, to obtain better prices for the services it purchases. Instead of paying full billed charges, which many service units do, bargaining for reduced fees and encouraging competition among contract providers could be undertaken by several service units acting in concert or by the area office. Use of Medicare DRG rates could generate substantial savings for the hospital inpatient care portion of the contract care program.

IHS intends to issue a general notice sometime in 1986 that will state that IHS will not use private providers (except in emergencies) unless the provider has a contract with IHS. IHS will not sign a contract with a provider unless it agrees to accept payment at no more than the "Medicare-allowable" rate, whether that rate be based on DRGs for inpatient care or on "reasonable and customary" charges for physician services. This policy would be applied to the 1,300 to 1,400 standing contracts that IHS currently maintains (78). Whether IHS will be successful in imposing these changes on private providers may depend on the existence of competition among those providers for IHS patients, because at least some providers can be expected to refuse to participate in the contract care program if these payment changes are made.

Option 8: Authorize IHS service units to carry over a percent of contract funds from one fiscal year to the next.

Although some tribally operated contract care programs may exercise this option, service unit contract care programs managed by IHS are not allowed to carry over funds, which further limits the ability to manage the program. Services may be restricted too severely early in the fiscal year in order to conserve funds, then virtually any service request may be authorized at the end of the year, including previously deferred services, to close out the budget. Congress could authorize IHS to carry over a certain percent of the annual allocation, perhaps 5 or 10 percent, to ease this problem.

Option 9: Provide greater IHS headquarters and area office support to service unit contract care programs in dealing with alternative resources, both public (especially State Medicaid programs) and private.

In order to utilize alternative resources most effectively, the contract care program must be able to respond to changes in the general health care environment that will affect services to IHS beneficiaries. Changes in State Medicaid programs can have significant impacts on IHS contract care programs. For example, in the State of Washington, a health services program for the medically indigent that included a large number of Indians was discontinued for about 6 months in 1985. The Portland area office estimated that if the program was not reinstated (it was reinstated in October 1985, but its future was uncertain), additional costs to the Portland IHS contract care program would have totaled at least $2 million per year. In Arizona, recent implementation of a Medicaid program has brought about a major realignment of IHS, county, and State health programs available to Indians. Thus, IHS contract care programs must keep current about changes in State Medicaid programs and assist all eligible Indians in enrolling and maintaining eligibility in those programs.

Option 10: Explore possibilities of developing long-term relationships with community facilities and of providing more services to non-Indians.

For IHS, discount rates might be possible if community facilities were assured a certain amount of referrals. If services were provided to non-Indians with the approval of the tribe(s), the extra revenues might make it possible for the program to provide a wider range of services than would be available if only Indians were served. (Some tribal and IHS programs already serve non-Indians with the consent of the affected tribes.) This would be consistent with the policy of self-determination, with the extra revenues used to improve services delivery. Congress already authorizes IHS to serve non-Indians in specific locations (e.g., Alaska), and the vetoed 1984 Indian Health Care Amendments would have provided this authority throughout IHS service areas, subject to the consent of the specific tribes affected.

Self-Determination and Tribal Assumption of Federal Indian Health Services

Under the Indian Self-Determination and Education Assistance Act of 1975 (Public Law 93-638, commonly known as the "638" law or program; see 25 U.S.C. 450, *et seq.*), tribes have the option of taking over the administration of programs managed by BIA and IHS. For tribes that have been provided direct IHS services, self-determination programs have often involved limited activities instead of the entire range of medical and health-related services. Indians that have most recently been added to the IHS service population (through restoration of their Federal status), such as in California and especially the Eastern United States, however, have received health services primarily through self-determination contracts. Under these contracts, tribes or their representatives, instead of IHS, operate outpatient clinics and purchase specialty and inpatient services through contract care.

The Self-Determination Act modifies the standard cost-reimbursement or fixed-cost contract. Federal procedures for procurement contracts require an "arms length" relationship between the Federal Government and the contractor. The government may unilaterally order changes in the scope of the contract and may terminate the contract at its convenience, while the contractor may not. Federal labor laws and equal opportunity provisions also apply to the contractor. On the other hand, in self-determination contracts, IHS and BIA are directed to assist tribes in developing contracts and to enter into all proposed contracts unless there are compelling reasons not to do so. All changes require the consent of the contractor. While the government may reassume management of the contract only for specified reasons, the contractor may terminate the contract and return management to IHS (retrocession) on 120 days' notice. Employees of tribal contractors are not subject to some Federal labor laws, and Indian preference in employment and training supersedes equal opportunity rules. Tribal contractors also enjoy exemption from bonding requirements and may carry over unspent contract funds to the following year.

The limited involvement in self-determination activities by tribes that have been accustomed to receive direct IHS services may be due to any of a number of factors. First, their lack of experience in administering health care programs has motivated many tribes to start slowly with limited responsibilities. **Second, the common perception of tribes seeking to administer more of their own programs is that IHS will not fund their activities at the same level that IHS itself had to operate the programs,** so tribes are reluctant to assume responsibility for a marginally funded program or one with declining resources. This disagreement on funding levels is most often focused on the level of administrative or indirect costs. Tribes point to IHS administrative positions that they believe should be abolished and the funds made available to them. IHS maintains that these positions are needed to monitor the self-determination contracts and to insure that IHS can resume administration of the programs if the tribes decide to return them, because the act allows tribes to retrocede these with 120 days' notice. **Third, many IHS service units serve multiple tribes, and the unanimous consent of all tribes within the service unit must be obtained before a takeover will be approved by IHS. Fourth, given the history of Federal-Indian relationships, some Indians suspect that the transfer of program administration from IHS may be another "termination" policy in disguise. Fifth, when tribes have contested IHS's self-determination policies, it has not been clear what they can contest and what procedures they must follow to appeal negative IHS rulings. Finally, Federal employees generally receive higher salaries and more fringe benefits than can be provided by the tribes, so there sometimes is resistance against conversion from IHS to tribal management even by Indian employees.** These differences, as well as costs for such items as malpractice insurance that IHS need not account for in its budget but for which tribally administered programs are responsible, have been cited as additional evidence that the tribes are not being offered the same level of resources as has been available to IHS.

A central issue that underlies many of the particular difficulties that have arisen in IHS's implementation of the Self-Determination Act is the apparent difference of opinion between the Federal Government and the tribes as to the intent of the law. While the Federal Government seems to view self-determination primarily as a contracting program, the tribes point out that the law distinguishes 638 contracts from other Federal contracts and suggest that the intent of the law is to support tribes in taking over and managing their own services.

Tribes believe that leadership commitment in IHS has not been strong enough, with little positive guidance provided to the area offices, to which responsibility for self-determination contract administration has been delegated. The area offices vary in their enthusiasm for such contracts and in the specific policies and procedures they apply in contract development, approval, and monitoring. As a consequence, there are uneven efforts to provide tribes with technical assistance to apply for these contracts, to negotiate contracts, and to manage these programs. Problems tribes claim to have experienced in applying for these contracts include: 1) lack of encouragement and adequate technical assistance from area office staff; 2) lack of cost data from area offices; 3) difficulties in some areas in securing and holding project support from 100 percent of the affected tribes (a particular problem in Alaska, with its many small native villages; and tribes can switch their affiliation from one health consortium to another, as sometimes happens in California); and 4) apparent inconsistencies in area decisions to approve or disapprove a proposal.

The contracts that are signed between IHS and the tribes in the self-determination program vary from area to area in terms of the flexibility they permit the tribes. Contracts in some areas specify exactly what services will be provided, to whom, and in what manner. In other areas, comprehensive service delivery contracts allow more room for tribal adjustments. The voucher reimbursement system that is used by IHS, as opposed to the BIA letter of credit approach, is the target of many complaints concerning delays and arbitrary decisionmaking by area staff.

The appropriate instrument to execute the legal and financial relationship between IHS and the tribes is a subject of disagreement. Contracting has been the predominant means, and grants have been used sparingly to support development of tribal capabilities in preparation for contract management. A new option known as a cooperative agreement is under consideration by IHS, but whether it would change the essential relationship is unclear.

Although some area offices seem to fear that the tribes will expand and redirect services contrary to the contract terms, the tribes cite management difficulties that require innovative solutions and argue that flexibility is justified. Conflicts such as these aggravate other disincentives, such as the greatly increased administrative responsibilities of tribal governments and their employees (including full responsibility for collecting applicable third-party reimbursements), the need to develop or expand personnel management and fringe benefits programs, and additional Federal reporting requirements. Self-determination contracts give tribes greater control over the selection of health program employees and include the option of maintaining or releasing staff who were Federal employees; but they also place on the tribe the burden of recruiting and retaining health professionals in locales that often are isolated, both physically and professionally.

Option 11: Clarify the intent and purpose of the Self-Determination Act.

It is the opinion of PHS that an IHS self-determination contract project is legally an extension of IHS itself. IHS is responsible for administering these contracts on behalf of its parent agency, HRSA, according to applicable Federal contracting and procurement policies as modified by the Self-Determination Act. Tribal contractors must be monitored to ensure that they adhere to the terms of their contracts. This interpretation allows little flexibility to the contractor to modify the scope of services it has agreed to deliver or to redefine its service population.

The purpose of the self-determination program as tribes see it is not contracting per se, which has been an option for many years under "Buy Indian" contracts, but self-determination. **Tribes contend, with reason, that self-determination contracts are not supposed to be administered exactly as other Federal contracts.**

A variety of conflicts has developed over the 10 years of IHS implementation of the Indian Self-Determination Act. Rather than attempting to resolve each specific complaint, it would be more reasonable to work to clarify and reaffirm the intent of the law. The technical aspects of the administrative and financial relationship between IHS and its tribal contractors are the subject of a study by the General Accounting Office (GAO) that will be available sometime in 1986. The study involves extensive field data collection, including interviews of tribal and IHS headquarters and area office officials. The GAO study will generate specific recommendations for improving the self-determination contracting process. An evaluation of BIA's implementation of the Self-Determination Act was completed in the summer of 1984 and identified problems similar to those uncovered in OTA's analysis of IHS's implementation of the law (118).

Option 12: Develop a cost-accounting method that addresses the question of comparable funding when tribes take over services previously administered by IHS.

The adequacy of funding for self-determination contracts is perhaps the issue most frequently debated between the tribes and IHS. Aside from the problem of the adequacy of IHS's overall budget, there are disputes over the appropriate level of funding that should be provided to tribal contractors. The law states that tribes should receive resources equivalent to what IHS spends on a particular package of services, but there is disagreement over what that amount should be, often focusing on the issue of compensation for indirect costs. What usually is meant by indirect costs is the administrative and support costs that are provided to IHS in its function as part of the Federal bureaucracy but all of which are not reflected in IHS's clinical services budget. These costs, which nevertheless become part of the tribal contractor's responsibilities, include employee fringe benefits packages; malpractice and other insurance coverage; costs of leasing facilities; technical staff for accounting, procurement, and data management; and other functions.

There appears to be disagreement about how indirect costs are determined , and no research has been done in IHS to determine a reasonable range of indirect costs. Early tribal contractors were awarded indirect costs in addition to the service delivery contract, but this additional funding is no longer available. Tribes therefore believe that they are being asked to absorb these costs, which cut into their direct care awards.

Option 13: Revise the retrocession provision so that a year's notice, instead of the present 120 days, must be given before a tribe can return the management program to IHS.

Another factor is the belief of tribes that as tribal contract activity increases, IHS area office staff should be reduced so that more funds can be devoted to direct care and tribal programs. IHS argues that monitoring of tribal contractors requires area office staff, and that the provision allowing tribes to retrocede a contract with only 120 days' notice also necessitates maintenance of a stable area office staff. Extending the notification period for retrocession would ease this situation somewhat.

The issues and their related options are summarized in table 1-2.

OTHER ISSUES

Several other issues that have or may have significant effects on the Federal-Indian relationship and the provision of health services to Indians deserve explicit recognition in this summary. These issues are: 1) Indian demographics and urban Indian health programs, 2) congressional control of Federal Indian health care policies, and 3) management issues concerning IHS.

Indian Demographics and Urban Indian Health Programs

One of the more difficult issues in providing health care to Indians is the basic question of who should be eligible for services. Yet, IHS must develop uniform standards for eligibility, which at times has led Congress to legislate exceptions to these regulations.

The issue of who is an "Indian" for the purpose of Federal health care benefits will be an increasingly difficult one as time passes. Even land-based, reservation Indians will not be immune to these changes. Marriage to non-Indians and migration away from the reservation to seek better employment opportunities will require tribes to make increasingly difficult decisions on who is a member of their tribe. Even for Indians who marry other Indians, their prospects for marrying an Indian from the same tribe are diminishing, and it is not improbable that a large number of non-tribal member Indians will result who will have more Indian blood than the average tribal member. Already, some tribes have had to reduce their tribal-specific blood quantum requirements for membership.

In the 1980 census, almost two-thirds of the 1.4 million persons identifying themselves as Indians lived off reservations, tribal trust lands, or other Indian lands. Of the 1.4 million Indians, 54 percent lived in metropolitan areas, and 59 percent were included in IHS's estimated service population. About 10 percent of Indians were living on or near reservations that were in or contiguous to metropolitan areas, and these Indians were served by IHS or tribal facilities.

However, IHS-supported programs for urban Indians have always been viewed as a separate activity from IHS's reservation-oriented direct services system. In 1972, IHS began to fund urban programs through its community development branch under the general authority of the Snyder Act. Appropriations were subsequently derived from the Indian Health Care Improvement Act of 1976, which authorized urban Indian organizations to contract with IHS to operate health centers and to increase accessibility of Indians to public assistance programs. There were 37 programs in 20 States in 1984.

A major distinction from IHS's direct services program is the urban programs' emphasis on increasing access to existing services funded by other public and private sources, instead of IHS's providing and paying for those services directly. Thus, IHS funds have provided an average of 51 percent of total urban Indian health program funds. Most of the programs offer a variety of social services and are "human service organizations." Thirty-two percent of the reported urban program encounters in fiscal year 1984 were medical; 10 percent were dental; 27 percent were health-related (health education, nutrition, mental health, optometry, and substance abuse programs); and 31 percent represented other community service contacts.

Urban Indian health programs serve both Indians and non-Indians. IHS regulations do not

Table 1-2.—Major Issues and Related Options

Eligibility and entitlement	Resource allocation and scope of services	Availability and adequacy of resources	Self-determination
Current situation: Persons of Indian descent, no blood quantum requirement. For services purchased by IHS from non-IHS providers, additional requirement that the individual must live on or near a federally recognized Indian reservation.	IHS does not provide the same health services in each of its service areas, and service area budgets are determined on a "historical" or "program continuity" basis. "Equity fund" of from $5 to $9 million per year (less than 2 percent of IHS's total clinical services budget) allocated on a needs-based formula to most-deficient service units; equity awards become part of future base budgets.	Minimal negotiations by IHS contract care programs with non-IHS providers on rates of payment.	Federal Government emphasizes its fiscal responsibilities for funds administered under 638 contracts. Indian tribes emphasize self-determination objectives and exceptions to Federal contracting rules. Major issue involves level of funding for tribes to provide the same level of services previously provided under IHS management, and to cover indirect costs such as liability insurance.
IHS proposed change: Eligible persons would have to be either members of federally recognized tribes and have at least one-quarter Indian blood, or other Indians of at least one-half Indian blood. In addition, eligible Indians must live on or near a federally recognized Indian reservation.	Equity fund approach would be applied to any future increases in appropriations.	Will initiate negotiations with IHS's contractors to accept payment at no more than the Medicare-allowable rate.	New tribal contractors would be provided indirect costs up to 14 percent; source of funds not yet determined.
OTA options: #1: IHS or Congress could develop a priority system for access to IHS services. #2: IHS or Congress could use blood quantum criteria to supplement rather than restrict eligibility criteria based on tribal membership. #3: If eligibility criteria are made more restrictive, Congress could make IHS services less a residual source of care and more an entitlement program.	#4: Continue with the modest, incremental approach to resource redistribution that IHS has implemented. #5: Accelerate the rate of reallocating funds among IHS service areas. #6: Work toward a common minimum services package for all IHS service areas.	#7: Negotiate payment rates with contract care providers instead of paying 100 percent of billed charges, and impose a rate structure on IHS contractors, such as use of Medicare DRG (diagnosis-related groups) rates. #8: Authorize IHS service units to carry over a percent of contract funds from one fiscal year to the next. #9: Provide greater IHS headquarters and area office support to service unit contract care programs in dealing with alternative resources, both public (especially State Medicaid programs) and private. #10: Explore the possibilities of developing long-term relationships with community facilities and of providing more services to non-Indians.	#11: Clarify the intent and purpose of the Self-Determination Act. #12: Develop a cost-accounting method that addresses the question of comparable funding when tribes take over services previously administered by IHS. #13: Revise the retrocession provision so that a year's notice, instead of the present 120 days, must be given before a tribe can return program management to IHS.

SOURCE: Office of Technology Assessment.

prohibit its urban programs from serving non-Indians, and funding from other Federal sources often requires urban Indian programs to serve certain populations that include non-Indians. Hence, the only requirement that IHS has required is that the number of Indians served by each program be proportional to the amount of money provided by IHS.

Support by IHS for urban Indian programs has raised conflicts in the Indian community, and the Administration has consistently tried to end funding of these programs, claiming that alternative resources are adequate for urban Indians. The National Tribal Chairmen's Association, for example, supported efforts to assist Indians in Indian communities and urban areas but felt that nontribal organizations, such as the nonprofit corporations that operate urban Indian programs, should coordinate the services they provide for Indians with tribal governments and elected Indian officials (93). Leaders of several urban Indian organizations, on the other hand, point out that in some urban centers, there are as many as 40 tribal governments nearby, and representation of tribes on urban Indian program governing boards might include over 80 different tribes. Urban Indian organizations also feel that the Federal Government must provide health care and social services to Indians regardless of their chosen residence (4). **As for the claim that alternative resources are adequate, the Administration has never documented that claim.** Moreover, IHS funds serve as core funding that enables the urban programs to seek out and qualify for other sources of care. **Considering the modest funds that have been appropriated for these programs, past government policies (e.g., allotment and termination) that broke up tribes and encouraged Indians to leave the reservation, and the use of IHS funds to help urban Indians qualify and gain access to other resources, these activities appear to be a logical and appropriate response that is not at cross purposes with IHS's reservation-oriented direct care system.**

Congressional Control of Federal Indian Health Care Policies

The Snyder Act of 1921 remains the basic authorizing legislation for Indian social services programs, including health services. Other statutes that have been relevant to the provision of health services to Indians are: 1) the Johnson O'Malley Act of 1934, which authorized contracts between the Federal Government and State and local governments to provide health care and other social services to Indians; 2) the Transfer Act of 1954, which transferred health care functions from the Department of the Interior's Bureau of Indian Affairs to the Public Health Service in the precursor to the current Department of Health and Human Services; 3) The Indian Health Facilities Act of 1957, which authorized IHS to contribute to the construction costs of community hospitals if that was a more effective alternative to direct construction of facilities for Indians; 4) the Indian Sanitation Facilities and Services Act of 1959, authorizing IHS to provide sanitation facilities to Indians; 5) the Indian Self-Determination and Education Assistance Act of 1975, which authorized BIA and IHS to turn over responsibilities for Indian programs to the tribes; and 6) the Indian Health Care Improvement Act of 1976 (reauthorized in 1980, passed again by Congress in 1984 with additional provisions but vetoed by the President, and extended through fiscal year 1986 by continuing resolution of Congress [H.R. Res. 465]).

These statutes provide the basis for Federal Indian health care, but the Snyder Act and the Indian Health Care Improvement Act have been the principal statutes authorizing health services to Indians. Without reauthorization of the Indian Health Care Improvement Act, congressional influence over Indian health care policies may diminish with only the general language of the Snyder Act as the statutory basis for defining what health care the Federal Government will provide to Indians. This impact can be expected to extend to the judicial system's role in resolving Indian health care issues, because much of the courts' role is in interpreting the congressional intent behind a statute. If explicit congressional directives on the kinds of programs the Federal Government should be conducting are lacking, the Administration will have much more discretion in determining what health benefits it will provide.

Congressional direction on Federal Indian health care will be especially crucial in the Fed-

eral budget climate of the next 5 to 10 years. Unlike the previous three decades, where attention was primarily directed at adding new initiatives, hard choices will most likely have to be made among Indian health care programs, either in terms of discontinuing some activities outright, or in determining which activities should be cut back more severely than others.

Indian Health Service Management Issues

It has not been the purpose of this OTA assessment to evaluate IHS management practices and information systems. In fact, when management issues arose during the course of this assessment, OTA suggested that GAO was the proper agency to be involved, a suggestion that in part led to the concurrent study by GAO on management practices in the self-determination contract program. Nevertheless, after a year's experience in working with a variety of IHS offices and staff (primarily at or through IHS headquarters) to obtain data, some general observations about IHS's data systems can be made.

First, however, it would be helpful to identify at least two other management issues facing IHS. These issues involve: 1) where in the Department of Health and Human Services IHS should be located, and 2) growing personnel problems in IHS.

The location of IHS in DHHS was an issue that was addressed by Congress in the vetoed 1984 amendments to the Indian Health Care Improvement Act. In fact, the provision in the amendments elevating IHS to a higher level within PHS was one of the reasons the President vetoed the bill. Within the Department of the Interior, BIA is a separate agency solely concerned with Indian affairs. IHS, whose responsibilities were transferred to PHS from BIA in the mid-1950s, is currently part of HRSA, one of five Federal agencies that comprise PHS (the other four are the National Institutes of Health; the Centers for Disease Control; the Food and Drug Administration; and the Alcohol, Drug Abuse, and Mental Health Administration). **IHS represents the bulk of HRSA's direct health care activities and approximately 35 percent of the total HRSA budget, and is the largest Federal health care system after those of the Department of Defense and the Veterans Administration.** Thus, in terms of access to higher levels within PHS and DHHS and accountability to organizations at lower levels (i.e., HRSA), IHS's position is not comparable to the position enjoyed by BIA in the Department of the Interior. **The attempted elevation of IHS through the vetoed amendments was based on the premise that IHS would have greater access to higher levels within DHHS, and that there would also be less duplication and clearer requirements for the paperwork that accompanies program administration and receipt of IHS funds.**

Indians are given preference in employment with BIA and IHS. This preference given to Indians is in contrast to the relative preference given to veterans for Federal employment by the "point" system. Indian preference applies to all BIA and IHS positions, whether for initial hiring, reinstatement, transfer, reassignment, promotion, or any other personnel action intended to fill a vacancy (42 CFR 36.42). This preference is also applied to tribally administered programs, although in a less strict manner, with the regulations stating that tribes may hire non-Indians "after giving full consideration to Indians" (42 CFR 36.221).

The positive and negative effects of Indian preference have never been formally assessed, but one consequence is that non-Indian BIA and IHS employees have limited opportunities for advancement, and this limitation is increasing. Necessary recruitment of highly qualified non-Indians will become increasingly difficult, and few will contemplate more than temporary employment because their career opportunities will be severely limited.

For the Indian BIA or IHS employee, a growing issue may well be that of conflicting roles—as a representative of the Federal Government in its relationship with Indians and as an advocate for increasing Federal benefits for Indians. For example, IHS is presently viewed by its parent organization (PHS in DHHS) as an advocate for its clients.

A different personnel issue concerns the impending end of a very important source of physicians and other health professionals from the NHSC scholarship program, which has given IHS first priority when the time comes for these profes-

sionals to repay their obligation through service in health manpower shortage areas. As mentioned previously, **after 1990, IHS cannot expect new recruits from this source.** Furthermore, the PHS Commissioned Corps will have a difficult time in staffing IHS, as that program also is not as attractive to professionals now that there is no military draft (service in the Corps was equivalent to active duty in the military). The Indian Health Care Improvement Act established scholarship programs for Indian health professionals, but that activity, although important in developing an Indian health professional cadre, cannot be expected to substantially replace NHSC and Commissioned Corps anytime in the near future. Thus, a serious problem for maintaining IHS direct services is staff shortages, and innovative approaches must be explored to address this problem.

Turning finally to IHS's data systems, OTA **found an array of uncoordinated service-specific data systems that have developed over the years in response to particular information needs. The delegation of most management responsibilities to IHS area offices has contributed to a lack of incentives to establish complete and consistent information for all 12 IHS areas.** The difficulties OTA had with evaluating the high-cost contract care cases illustrate this problem.

Another major impediment to the generation of complete and consistent IHS data is the exemption of self-determination contract programs and urban Indian health projects from IHS data reporting requirements. Tribal participation in existing IHS data systems is voluntary, and most tribal contractors do not operate within IHS systems. The lack of clinical, utilization, and management data due to nonparticipation in IHS data systems is a serious problem and will become worse as more services are transferred to tribal management, unless an IHS policy of November 1985 requiring participation in essential data systems is enforced. Lack of data was a particularly difficult obstacle in OTA's attempts to compare funding, utilization, and health status among Indians in the 12 IHS areas (particularly those heavily dependent on self-determination contracts).

It is likely that much more information could be derived from existing IHS data systems than currently is being sought and provided. A great amount of data is being collected by IHS, but there is no overall framework or purpose guiding that data collection and its use. An assessment and coordination of existing data systems could be undertaken as an interim solution while planning for implementation of a more rational and cost-effective system takes place. Such planning now is underway, and IHS budget proposals for fiscal year 1987 include earmarked funds for IHS data system implementation. In IHS, however, where resources for services delivery are seen as chronically inadequate, any funds spent on data systems are likely to be viewed as better spent on direct services. This attitude certainly would be more pronounced among tribal contractors, who already view their budgets as inadequate for direct services.

Agreement by all parties concerned on the validity and comprehensiveness of data on the Indian population, their health status, and on the availability and use of services among the 12 IHS service areas, is a necessary precondition to the kinds of negotiations that will be taking place between Indian tribes, Congress, and the Administration in the coming years.

Chapter 2

The Federal-Indian Relationship

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Chapter 2

The Federal-Indian Relationship

HISTORICAL OVERVIEW

Most colonial powers followed some variation of the "doctrine of discovery" and "aboriginal title" in their land dealings with Indians. Europeans considered Indian political-tribal units as holding something akin to "use rights" over their traditional territories, with the ability to transfer valid title to the arriving nations. Under the "doctrine of discovery," the nation with the first contact could acquire title from individual Indian tribes. Individual settlers had no rights to acquire land from Indians and could only acquire land through their sovereign.

This land acquisition system was a critical part of the relationship that eventually was established between the United States and the Indian tribes. Tribes and their members were treated as separate and legally different from other people inhabiting the continent. Great Britain and, later, the United States, assumed the obligation to protect the tribes. (For example, the Royal Proclamation of 1763 acknowledged tribal rights to protection of their lands, borders, and the removal of non-Indians.) In addition to practices maintaining tribal separatism, the Federal Government sought to "civilize" Indians, which included European forms of education and farming, and conversion to Christianity. Thus, non-Indian governments gradually assumed responsibilities that went beyond overseeing only the physical assets of the tribes.

The policies that the United States would adopt toward Indian tribes and their members were carefully considered by the Founding Fathers. George Washington was of the view that the United States needed to protect Indians from the "avarice" of non-Indians and observed that it also was good policy to be on friendly terms with the Indians (103). This viewpoint was codified in the Northwest Ordinance and the Indian Trade and Intercourse Act of 1790 and was reflected in the series of treaties that the United States entered into with the tribes following the Revolutionary War.

Treaties became a major basis for the legal relationship of the newly formed United States with the Indian tribes, including the obligation of the Federal Government to provide services. Having a treaty that specified some form of health care was, however, not a prerequisite for a tribe to receive health services. By the mid-19th century, appropriations for Indian health care had become routine. About half of the approximately 70 Indian agencies had a doctor on its staff (217). Indian agents, the local representatives of the Federal Government, were judicially determined to have inherent or discretionary authority to provide medical services to tribes under their control (125).

Treaties were the exclusive responsibility of the Senate, but by 1871, the treaty-making period had ended as the House of Representatives sought increased involvement in the agreements with Indian tribes. Thereafter, both the House and the Senate would deal with the tribes by statute rather than by treaty (23,210). It is important to note that at the time treaty-making ended, the States were almost entirely excluded from any involvement in Indian affairs, and Indian tribes functioned as political units in their relationships with the government of the United States. Moreover, almost no attention was paid to individual Indians by the United States; they were the responsibility of their tribes. Indians were not citizens of the United States and as individuals had almost no rights within the legal system of the United States.

The allotment period began a decade after the end of treaty-making, with the Federal relationship with Indians shifting from that of a government dealing with another government to a new stratagem that was anti-tribal government. Allotment essentially broke up tribally held communal lands. (Although there were a number of allotment acts, the classic is the Dawes Act [24 Stat. 388 (1887)].) Although many tribes existed in deplorable conditions, they existed on lands wanted by settlers, miners, and other economic interests.

Assimilation, often referred to as "civilization" of individual Indians, became the dominant thrust of the Federal allotment policy (35,102). Each adult was assigned a specific amount of land (usually 160 acres), and some relatively small amount of land was set aside for tribal purposes (schools, cemeteries, and the like). The "excess lands" remaining were opened to non-Indian settlement. Indian land was to be held in trust, as were the proceeds from the sale of "excess lands," for a limited period of years. The theory was that during this trust period individual Indians would become farmers and leave their Indian ways. They were to be emancipated from their tribes and become eligible for U.S. citizenship.

During the allotment period, the Bureau of Indian Affairs (BIA) became the dominant institutional force on Indian reservations (54). The bureau, along with missionaries, were to civilize the Indians. Along with the expansion of social services to the tribes, the bureau actively suppressed traditional modes of tribal governance, Indian languages, and Indian religious and cultural practices. Thus, education, medical services, law enforcement, and all components of government became an aggressive part of the Federal definition of its trustee role to "civilize" Indians.

The first Indian hospital was built in Pennsylvania, where there were no reservations, in connection with the Carlisle Indian Boarding School. Carlisle was the prototype boarding school where Indian children who had been removed from their reservations were to be "civilized" in the absence of tribal influences. By the turn of the century, a total of five hospitals had been constructed to serve Indians. None of the five had a specific authorization or appropriation from Congress (217). Health services were seen as a natural and necessary part of the "civilizing" function that the Nation had adopted.

By the early 1900s Congress began to pass disease-specific legislation. In 1906, Congress began the effort against tuberculosis among Indians (34 Stat. 325, 328 [1906]). In 1909, programs against trachoma were begun (35 Stat. 269, 271 [1909]).

The 1920s provided several events of significance to Indians. They became citizens of the United States through the Citizenship Act of 1924 (8 U.S.C. section 1401b). The Snyder Act, the major basis for Federal health and social services for Indians, was enacted in 1921 (25 U.S.C. section 13), and the congressionally commissioned Meriam Report of 1928 was influential in changing the course of Federal-tribal relations.

The Snyder Act of 1921 was passed to provide authorizing legislation for appropriations that Congress had been providing for some time, but without specific statutory authority. The entire act (except for a 1976 amendment making postsecondary Indian schools eligible for participation in the Higher Education Act of 1965) reads as follows (25 U.S.C. section 13):

> The Bureau of Indian Affairs, under the supervision of the Secretary of the Interior, shall direct, supervise, and expend such moneys as Congress may from time to time appropriate, for the benefit, care, and assistance of the Indians throughout the United States for the following purposes:
>
> General support and civilization, including education.
> For relief of distress and conservation of health.
> For industrial assistance and advancement and general administration of Indian property.
> For extension, improvement, operation, and maintenance of existing Indian irrigation systems and for development of water supplies.
> For the enlargement, extension, improvement, and repair of the buildings and grounds of existing plants and projects.
> For the employment of inspectors, supervisors, superintendents, clerks, field matrons, farmers, physicians, Indian police, Indian judges, and other employees.
> For the suppression of traffic in intoxicating liquor and deleterious drugs.

> For the purchase of horse-drawn and motor-propelled passenger-carrying vehicles for official use.
>
> And for general and incidental expenses in connection with the administration of Indian affairs.

Utilizing the Meriam Commission's report, the New Deal proposed extensive legislation for the long-term renewal of tribal governments. Assimilation was still an underlying, ultimate goal, but it was to be achieved by Indians operating through their own systems.

A number of legislative proposals were enacted into law by Congress in the 1930s. The Indian Reorganization Act of 1934 (25 U.S.C. sections 461, *et seq.*) ended allotment, extended the trust indefinitely, established federally chartered corporations for tribes to reorganize into, and established economic development programs for tribes. The Johnson O'Malley Act of 1934 (25 U.S.C. sections 452, *et seq.*) authorized the Federal Government to contract with agencies, including State agencies, to provide services (including medical services) to Indians. The Johnson O'Malley Act did two things of major consequence: it provided for expanded health services to Indians and established the first real mechanism for State involvement with Indian health care.

Following World War II, Federal-Indian policy again changed course, reversing the policies of the New Deal toward what was eventually condemned as "termination." Termination had several components: 1) the induced resettlement of thousands of reservation Indians into urban centers where they were to be trained and employed; 2) the transfer of major functions, responsibilities and jurisdiction over Indians to States from the Federal Government (18 U.S.C. section 1162; 28 U.S.C. section 1360); and 3) termination of the Federal relationship with specific tribes, including ending services and distributing tribal assets to individual tribal members.

Indian hospitals were closed, and there was increased emphasis on transferring service responsibilities to the States. California, for example, requested that the Federal Government cease providing health care to Indians residing in that State. In part, the terminationist thrust was responsible for the transfer of the responsibility for Indian health care away from BIA in the Department of the Interior to the Public Health Service in what was then the Department of Health, Education, and Welfare (42 U.S.C. sections 2001, *et seq.*).

The termination period was in turn replaced by the current phase of Federal-Indian relationships, commonly known as Indian Self-Determination. But termination had created profound changes in the demographics and definitions of Indians. Hundreds of thousands of Indians who were members of recognized tribes no longer resided on reservations or even near reservations. Thousands of other Indians had been declared to have been terminated by acts of Congress and no longer were federally recognized Indians.

The modern self-determination era began at roughly the same time as the major expansion of Federal programs and services that characterized the "Great Society." This recent self-determination era has been characterized by a general revitalization of tribal governments and a large increase in Indian-related litigation. Two statutes have been of special importance. The Indian Self-Determination and Education and Assistance Act of 1975 (25 U.S.C. sections 450, *et seq.*) provided for the transfer to tribes of functions that were previously performed by the Federal Government, including the provision of health services. The other statute, the Indian Health Care Improvement Act of 1976 (25 U.S.C. sections 1601, *et seq.*), was the only Federal statute to clearly reflect Congress' view on health care for Indians and was, in effect, a clarification of the Federal responsibilities recognized by the Snyder Act. The Indian Health Care Improvement Act states that (25 U.S.C. section 1602):

> The Congress hereby declares that it is the policy of this Nation, in fulfillment of its special responsibilities and legal obligation to the American Indian people, to meet the national goal of providing the highest possible health status to Indians and to provide existing Indian health services with all resources necessary to effect that policy.

ELIGIBILITY FOR FEDERAL SERVICES

Federally Recognized Tribes

Membership in a federally recognized tribe is the single most common standard for determining eligibility for Federal services. Therefore, the questions of what is a tribe, and for what purposes, need to be addressed.

Tribes were defined early in the Nation's judicial history in *Worcester* v. *Georgia* (220), and although modified by many cases, the definition remains applicable:

> Indian tribes are "distinct, independent political communities possessing and exercising the power of self government . . ."

The tribe, whether denoted as a band, nation, rancheria, Pueblo, community, or native village, is the only self-governing political unit that represents Indians within the Federal-Indian relationship. Conceptually, whatever rights exist for individual Indians in the Federal-Indian relationship are derived from tribal membership.

The seeming purity of the concept, however, has been muddled by the pendulum swings in Federal laws and policies toward Indians. The allotment period left a legacy of vested rights in individual Indians with respect to part of the reservation lands. The 1934 Indian Reorganization Act created additional definitions of Indians in its attempt to assist tribes. Still later, termination created a situation in which persons who racially and culturally had remained Indian no longer had a political entity (the tribe) representing them that had any legal/political relationship with the United States. As a result, these Indian individuals for the most part lost their rights to services provided to Indians. Relocation created a situation in which Indians who retained their tribal membership might no longer be located near the network of reservation-based services that had been created. Finally, the explosion of social service and poverty-oriented programs in the 1960s and 1970s sometimes included tribes and sometimes did not. Some of these programs extended eligibility to Indian individuals who did not qualify for Federal services that were directed at tribally affiliated Indians.

With the exception of non-Indians appointed to represent Indians in some trustee capacity, the entity that represented Indians was whatever governing body the particular band, tribe, or confederacy of Indians set for itself. In dealing with the Federal Government, however, competing or even bogus entities became an issue in determining who spoke for particular groups of Indians. During the treaty period, unscrupulous negotiators on the part of the United States would sometimes choose or bribe individual Indians to serve as "official" representatives for the tribe involved in the treaty. The treaty that was so negotiated was allowed to stand, even though the individuals involved often did not in fact represent the tribe in question. Whomever the United States chose to deal with became the official tribe in the eyes of the U.S. legal system. This outcome is not dissimilar to those in international relations, where the United States or other governments may deny formal recognition to a government if they prefer to recognize a different or prior government. (For example, for more than 20 years the United States recognized the Nationalist Chinese Government of Taiwan, but not the People's Republic of China, as representing "China.") Such matters are viewed by the courts as political questions and generally are not held to be reviewable. Currently, there still are tribes with governing bodies that have been recognized by the United States but which have other, often-times traditional, governing bodies in existence.

Individual bands and tribes that were placed on a single reservation have also been consolidated into new political units corresponding to the larger reservation community, such as the Confederated Tribes of the Colville Reservation or the Three Affiliated Tribes of the Fort Berthold Indian Reservation. Generally, the treaty, statute, executive order, and/or constitution of the tribe or tribes involved will delineate who is the responsible governing body, and that document or documents will be controlling in determining who is the official tribal government. These mergers or consolidations of preexisting tribes or bands, however, have not always been successful. There are situations that have completely paralyzed reservation communities and prevented any entity from effectively serving as a tribal government. Such situations may require congressional adjustment of the affected reservation.

Once a tribe has been recognized as a tribe by the United States, it does not lose its status unless the United States terminates the political relationship. Although it is not always clear how some tribes became federally recognized and others did not, Federal recognition of a tribe is the key ingredient for access to most Federal services that are provided on the basis of the Federal-Indian relationship. Early statutes rarely provided definitions of Indians or tribes and simply referred to either a particular tribe or to Indians generally. It was quite clear to everyone involved in those earlier days who the tribes were and who was an Indian.

Most of the modern statutes that provide services to Indians as part of the Federal-Indian relationship follow a fairly standard definition of an Indian tribe. The Indian Health Care Improvement Act contains the following definition (25 U.S.C. section 1603d):

> "Indian tribe" means any tribe, band, nation, or other organized group or community, including any Alaskan Native Village or group or regional or village corporation as defined or established pursuant to the Alaska Native Claims Settlement Act (85 Stat. 688) [43 U.S.C. sec. 1601 et seq.], which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

Given this somewhat circular definition of an Indian tribe as one recognized by the United States as an Indian tribe, the issue is: Who are the recognized tribes? Where either a statute, treaty, or historical relationship clearly has linked the United States with the governing body of a tribe, that tribe is usually a recognized tribe for the purposes of the Federal-Indian relationship. For the rest of the groups of Indians, the issue is more complicated.

One case that addressed this issue was *United States* v. *Washington* (126), in which the court found that neither Congress nor the executive branch has prescribed any standardized definition for either the term "Indian" or "Indian tribe" in terms of the special Federal relationship with Indians (126). The case involved a determination of which descendants of groups that were parties to the various western Washington fishing treaties were tribes for the purpose of sharing in the treaty rights. The Federal District Court Judge stated in his conclusion (126):

> In determining whether a group of persons have maintained Indian tribal relations and a tribal structure sufficient to constitute them as an Indian tribe having a continuing special political relationship with the United States, the extent to which the group's members are persons of Indian ancestry who live or were brought up in an Indian society or community, the extent and nature of the members' participation in tribal affairs, the extent to which the group exercises political control over a specific territory, the historical continuity of the foregoing factors and the extent of express acknowledgment of such political status by those Federal authorities together with the power and the duty to prescribe or administer the special political relationships between the United States and Indians are all relevant factors to be considered.

The judge found on the basis of this reasoning that none of the Indian groups petitioning to intervene in *United States v. Washington* (126) were Indian tribes. They were Indian descendants or groups that had participated in the treaties, but they were not tribes, and their members, although racially Indian, were not Indians with respect to the Federal-Indian relationship. To the extent that these individuals were eligible for any Federal services, specific statutory authorization would need to be found.

Contemporaneous with the decision in *United States* v. *Washington*, in 1978 the Department of the Interior issued in final form its first formal mechanism for determining whether a group was an Indian tribe for the purpose of the Federal-Indian relationship (25 CFR 54). (Congress, of course, did not give up its authority to recognize specific tribes by statute; e.g., the Maine Claims Settlement Act [25 U.S.C. sections 1721, *et seq.*].) These regulations created what is known as the Federal Acknowledgment Process and set out the criteria that petitioning groups would have to meet to receive Federal recognition. In general terms, petitioners would have to show that the Indian group (141):

- had been identified as Indian from historic times to the present on a substantially continuous basis;
- had occupied a specific geographic area or community distinct from other populations in the area, and its members are descendants of an Indian tribe that historically inhabited a specific area;
- had maintained tribal political authority over its members as an autonomous entity throughout history;
- had governing procedures pertaining to membership;
- had a membership role that was historically traceable to the historical entity defined above;
- had no members who were primarily of any other tribe; and
- had not been legislatively terminated.

The criteria have not been easy to meet, and the Acknowledgment Process has not resulted in the speedy determination of which Indian groups should be recognized as tribes.

In addition to federally recognized tribes and groups that have not been recognized, there are tribes that have been terminated. Termination was a legal process where by statute, the United States severed its ties with particular tribes. Termination is now a discredited Federal policy, but, as with all Federal Indian policies of the last two centuries, the negative effects linger. Many terminated tribes remain terminated; their members are not "Indians" for the purpose of Federal programs. Several tribes, however, have been statutorily restored by Federal legislation to their previous status as federally recognized tribes (e.g., the Menominee Tribe of Wisconsin). In addition to those few tribes that have been statutorily restored, the termination of many of the California tribes and rancherias has been held to be defective by the Federal courts, and these tribes retain their service rights.

There are also a host of Indian organizations—formal, informal, statutorily created, statutorily acknowledged, or creatures of tribal government—that are not tribes. Membership in any such organization is not the same as membership in a federally recognized tribe, and no generic rights are conferred by membership. To the extent that a role is provided for any particular organization, that role is specific and, unlike tribes, no inherent governmental power is inferred. For example, the statute on Indian education (25 U.S.C. section 2019) defines both agency school boards and Indian organizations and delineates the specific functions each will assume in the BIA education system. In the health area, the Indian Health Care Improvement Act acknowledged urban Indian health programs (they were begun under the general authority of the Snyder Act) and authorized funds for them. Urban Indian organizations operating these programs are recognized as having distinct and specific roles in the delivery of health care to Indian people in urban settings (25 U.S.C. sections 1651-1658).

Eligibility of Indian Individuals for Federal Services

For most of the years that the Federal Government has been providing services to Indians, the question of who was an Indian was not particularly significant. Such questions most frequently arose in determining whether a particular individual or class of individuals had been emancipated from their tribal ways, or whether a particular individual or class of individuals was subject to Federal criminal statutes that asserted Federal jurisdiction over Indians for some offenses.

Who was an Indian for the provision of health services was definitely not a significant issue. Frequently, appropriations language was so vague that it was BIA that determined who received benefits. The Federal bureaucracy that had developed to provide services to Indians became accustomed to determining the nature and scope of services that the tribes were to receive.

Historically, during the period when tribes were distinct and separate, who was an Indian was not a particularly difficult factual or legal question. Congress in the Snyder Act did not see any need to define "Indian" because at the time of the act (1921), services were only provided to those Indian tribes that were recognized as having a political relationship with the United States.

Today, however, several hundred years of shifting law and policy have generated different categories. For example there are, among other categories, terminated, nonrecognized, and urban Indians. The post-1960 statutes that authorize services pursuant to the Federal-Indian relationship do not really address the issue of who is an Indian because of the somewhat circular definition described above.

Generally speaking, the political definition of "Indian" is the province of each Indian tribe. This power of tribes to define their membership has been repeatedly recognized by Federal courts (20,28,98). Each tribe may use its own criteria, but for the most part, tribes have required some level of Indian blood of the particular tribe for membership. With the exception of a number of tribes without blood quantum requirements, most tribes have at least a one-eighth blood quantum requirement (129). Without specific Federal legislation that overrides or controls the membership determination, the courts defer to the tribes (75). This is true even under the Indian Civil Rights Act of 1968 (25 U.S.C. sections 1301-1303), which states that no Indian tribe shall "deny any person within its jurisdiction the equal protection of the laws or deprive any person of liberty or property without due process of law . . ." The courts would not interfere in a case where only the children of male tribal members were eligible for tribal membership in mixed marriage situations, and held that such matters were within the authority of the tribe to determine (74).

Congress, however, can and does expand or narrow the definition of "Indian." Thus, it is important to examine the specific purposes for which the definition of Indian is being used in given circumstances.

Statutes that define who is an Indian may have broad implications. A prime example is a statute that either acknowledges the Federal-Indian relationship with a tribe, or terminates that relationship. Other statutes that are part of the Federal-Indian relationship are more limited in their scope. For example, the definition that Congress used for Native Alaskans concerning the importation of reindeer (25 U.S.C. section 500), although appropriate for this purpose, should have no particular implications for the delivery of health services. Moreover, rolls established for the distribution of monetary judgments awarded in cases of ancient Indian claims may include persons who are not eligible for tribal membership according to the criteria that the tribe currently has in place.

There are also a host of Federal statutes that provide services to Indians and that contain varying definitions of Indians and/or Indian tribes. Many of these statutes are not premised on the Federal-Indian relationship, and the services provided to Indians are usually part of a larger program of which Indians are but one beneficiary class.

The Snyder Act contains no express statutory language on who shall be eligible for Indian Health Service (IHS) services other than "Indians throughout the United States." In the absence of clear congressional direction, the question becomes to what degree agencies can restrict or alter the definition of who is an Indian.

The leading case in the area of agency discretion is the 1974 decision of *Morton* v. *Ruiz* (89). Ruiz, a member of a federally recognized tribe, had close ties with his reservation but lived off the reservation in a nearby Indian community located on the former aboriginal lands of his tribe. He was denied benefits from a BIA program known as General Assistance. The denial was based solely on the fact that he did not live on the reservation. BIA's authority to provide general assistance to Indians is the Snyder Act, which does not contain any express limitations with respect to reservation residency. The Supreme Court, however, did not consider *Morton* v. *Ruiz* as a case where the statutory language was clear and controlling. Such an analysis by the Court would have struck down any agency construction of the statute that had the effect of narrowing the statutorily designated group of beneficiaries. Instead, the Supreme Court viewed the Snyder Act as an enabling act under which an agency would be allowed significant discretion in determining the scope of programs.

The Government urged in *Morton* v. *Ruiz* that under a previous ruling giving great discretion to administrative agencies (42), agencies should be allowed great latitude in implementing their governing statutes. The Government also asserted that the limitation of services to reservation residents was required, given the limited appropriations that Congress had provided for the program, and that Congress by not overturning the regulations had ratified the agency's actions over the course of the years.

The Supreme Court found that Ruiz was an individual within the class of intended beneficiaries, and in effect struck down the reservation-only service criteria. Its decision seems to be based more on the lack of consistency between BIA's own policy and its representations to Congress than on any other factor. In reaching its conclusions, however, the Court did set out a fairly permissive standard for agency decisionmaking (89):

> (I)t does not necessarily follow that the Secretary is without power to create reasonable classifications and eligibility requirements in order to allocate the limited funds available . . . (I)f there were only enough funds appropriated to provide meaningfully for 10,000 needy Indian beneficiaries and the entire class of eligible beneficiaries numbered 20,000, it would be incumbent upon the BIA to develop an eligibility standard . . . The power of an administrative agency to administer a congressionally created and funded program necessarily requires the formulation of policy and the making of rules to fill any gap left implicitly or explicitly by Congress.

Morton v. *Ruiz* is therefore extremely relevant to the issue of who is an Indian for the delivery of health care services because of the latitude it gives to agencies to determine eligibility.

Shortly after the *Morton* v. *Ruiz* decision, IHS attempted to limit the eligibility of Indians for contract care to Indians living on or near reservations. Since IHS chose to codify its policy by fiat, its initial attempt was struck down (65) for failure to follow the publication and notice requirements of the Administrative Procedure Act (APA) (5 U.S.C. section 601e). However. similar regulations were subsequently published under APA that contained the same contract care restrictions. These regulations, which have not been challenged on a substantive basis, are currently operational.

Therefore, adequate notification and opportunity to comment must take place before a regulation implementing a statute is formalized. However, under APA, the Federal agency's action is presumed to be valid and must be confirmed if its actions were not "arbitrary, capricious, or otherwise not in accordance with law" (5 U.S.C. section 706[2][A]). The action is valid if all the relevant factors were considered, and any discernible rational basis existed for the agency's actions (22).

Another standard for judicial review of agency rulemaking is applicable to constitutional claims under the equal protection clause of the 14th amendment. Under this standard, a "rational basis" must exist for the agency's actions (25). This standard is similar to, but not a substitute for, the statutory standard set out in APA. A stricter standard is applicable when suspect classifications (e.g., ancestry [96], race [81], alienage [41]) or fundamental constitutional rights (e.g., right of interstate travel [108], right to vote [14], right of privacy with respect to abortion [105]) are involved.

In the 1980 case of *Rincon Band of Mission Indians* v. *Califano* (104), a band of California Indians sued for their fair share of IHS resources. They argued that, in examining IHS's method of allocation, the stricter constitutional standard of reviewing IHS's conduct be applied. IHS, on the other hand, argued that a "rational basis" test be used, claiming that no constitutional rights were involved.

The district court found that IHS's allocation system had no rational basis, thereby violating California Indians' right to equal protection of the laws as guaranteed by the due process clause of the fifth amendment. Because it found that the allocation system had no rational basis, the court did not find it necessary to decide whether the "strict scrutiny" standard was appropriate.

On appeal, the ninth circuit affirmed the district court's decision, but on the basis that IHS had breached its statutory responsibilities to the California Indians, so it did not find it necessary to address the constitutional question. Thus, at least the minimum requirements of APA must be met, with the application of a higher constitutional standard yet to be fully adjudicated.

The California Indians had also contended that the Snyder Act and the Indian Health Care Improvement Act of 1976 created a trust obligation between the United States and Indians, and that IHS had breached its fiduciary duty as trustee by failing to provide California Indians with a level of health services comparable to that provided Indians elsewhere in the United States. The ninth circuit indicated that it would not make such a finding, but stated that it did not have to rule on the applicability of the trust responsibility to the two statutes to make its decision.

Turning next to the degree of Indian blood an individual must have in order to be eligible for Federal benefits, the issue of a blood quantum requirement beyond the level that a tribe sets for itself is a conceptually difficult one, because the Federal-Indian relationship is based on political, not racial, factors. Moreover, blood quantum as a standard for providing services comes factually close to a suspect racial classification under constitutional law.

Congress, in its attempt to revitalize the tribes, provided in the Indian Reorganization Act (25 U.S.C. section 45) for preference in employment for Indian persons in the Federal Indian Service. (Earlier statutes also contained preference provisions.) The act set out a several-part definition of eligibility (25 U.S.C. section 45):

> All persons of Indian descent who are members of any recognized tribe now under Federal jurisdiction, and all persons who are descendants of such members who were on June 1, 1934, residing within the present boundaries of any Indian reservation, and shall further include all other persons of one-half or more Indian blood.

The clear language of the statute created three categories. However, for over 40 years, BIA took the third category, one-half or more Indian blood, and used it as an overlay governing the other categories. Thus, to qualify for Indian preference, one had to be a half-blood member or a half-blood descendant of a member. The action of BIA was outside the plain language of the law, and the half-blood requirement was finally dropped following a legal challenge (213).

While IHS considers its eligible population to be persons of Indian descent (42 CFR 36.12), some of the programs provided by BIA under the authority of the Snyder Act require that individual Indians be a member of a federally recognized tribe or have one-fourth degree or more Indian blood to receive services (25 CFR section 20.1[n]). However, unlike the Indian Employment Preference legislation, which contained a statutory definition of who was eligible that BIA had clearly violated, there is no express statutory language in the Snyder Act other than "Indians throughout the United States." Under these circumstances, therefore, the rational basis test of *Morton* v. *Ruiz* (89) is probably operable.

Finally, there is the question of whether Alaska Natives stand in any different position than Indians generally with respect to the Federal provision of health services. The issue comes up because of the unique land claims settlement and corporate structure created by the Alaska Native Claims Settlement Act (ANCSA) (43 U.S.C. sections 1601, *et seq.*). Under ANCSA a complex system of corporations has been set up to hold and invest both the land and monetary aspects of the settlement. Alaskan native people received stock in these corporations. Undeveloped lands were to remain nontaxable until the year 1991, the year that Native-held stock would also become freely transferable. These provisions resemble aspects of the Federal trust relationship with respect to the physical assets of tribes in the "lower 48" States. ANCSA, however, is a land claims settlement and not legislation that defines or limits in any way the preexisting special trust relationship that Alaska Natives have with the United States.

ANCSA by its own terms provides that it is for the extinguishment of land claims and shall not be deemed to substitute for any governmental programs otherwise available (43 U.S.C. section 1626a). Most commentators agree that ANCSA neither created a new trust relationship nor terminated the preexisting trust relationship between the United States and Alaska Natives. (ANSCA, however, did provide a definition of Alaskan Natives that has been adopted in other Federal statutes.)

IS THE INDIAN HEALTH SERVICE A PRIMARY OR RESIDUAL HEALTH CARE PROVIDER?

Indians are U.S. citizens and also are eligible for services provided to other U.S. citizens, including both Federal and State services. Through regulations, IHS services are residual to other sources; i.e., other governmental and private sources of care for which the Indian patient is eligible must be exhausted before IHS is obligated to pay for medical care. The residual payer role of IHS is discretionary for direct IHS services (42 CFR 36.12[c]); and as a matter of policy, IHS generally will provide services to a patient in IHS facilities regardless of other resources, but will seek reimbursement from these other sources for the care provided. In contrast, IHS's residual payer role is mandatory for contract care obtained from non-IHS providers (42 CFR 36.23[f]); and IHS will not authorize contract care until other resources have been exhausted or a determination has been made that the patient is not eligible for alternative sources of care.

One issue that has arisen from this "residual payer" situation is the question of who is the primary, and who is the residual payer, when State or local governments also have a residual payer rule. This situation arose in litigation between IHS and Roosevelt County, Montana, with the county arguing that it was not discriminating against Indians, but merely applying its alternate resource policy across the board to all eligible citizens who have double coverage, thereby meeting the "rational basis" test for judicial review (79).

The vetoed Indian Health Care Improvement Act Amendments of 1984 provided for a "Demonstration Program Regarding Eligibility of Certain Indians for Medical and Health Services" (section 204[a]). The provision, commonly known as the "Montana amendment," was designed to relieve what several Montana counties saw as their financial burden in providing and paying for medical services to indigent Indians. The amendment was converted into a Montana-only demonstration project in the House-Senate conference and would have made IHS financially responsible for medical care to indigent Indians in Montana. This responsibility was to exist only where State or local indigent health services were funded from taxes on real property and the indigent Indian resided on Indian property exempt from such taxation. Senator Melcher of Montana analogized his amendment to the type of services that BIA provides to Indians for education or general assistance. The conference report on the bill stated that the provision would not preclude an Indian from receiving State or county-provided health care services or financial assistance for health care services that are provided to all State citizens; nor that it would preclude an otherwise eligible Indian from participating in Medicaid, even where those benefits were paid for in part by State or local funds derived from revenues raised from real estate property taxes (133).

President Reagan disagreed with such an approach and vetoed the legislation. Two concepts underlie the President's veto. The first is that the amendment would allow States to deny services to Indians, an act that would be unconstitutional under the equal protection clause of the 14th amendment. Indians, as State citizens, are constitutionally entitled to State and local health benefits on the same basis as other citizens. The other concept is that, under IHS's contract care eligibility standards, the Federal Government can place its provision of services to Indians in a secondary or residual position. The State or county cannot presume that Indians have a right or entitlement to IHS contract care services so that it can deny assistance on the grounds of double coverage. In fact, the Federal regulations on contract care expressly deny that such a right exists. In such a conflict, the supremacy clause of the Constitution would resolve the issue in favor of the IHS regulation (79).

In January 1986, in *McNabb* v. *Heckler, et al.* (82), the United States District Court for the District of Montana, Great Falls Division, ruled that the Federal Government, and not Roosevelt County, was primarily responsible for the care of the Indian plaintiff. Though the court did not find the trust doctrine, the Snyder Act, or the Indian Health Care Improvement Act as individually entitling Indians to Federal health care, the court found that the two statutes, read in conjunction with the trust doctrine, placed the burden on IHS to assure reasonable health care for eligible members. The court, however, did not address the equal protection and supremacy clause arguments outlined above, and the decision is being appealed (80). Furthermore, the court invited Congress to address the issue by stating that:

> The better avenue for resolution of disputes of the type presented here rests with the legislative branch. This court can only interpret the limited legislative enactments and statements of congressional intent available to it. Congress could quickly resolve a question which this court has wrestled with for many months (82).

CONCLUSIONS

Federal law and policy have evolved through a complex mixture of practice, court decisions, and congressional legislative and appropriations activities. Periodic shifts, including complete reversals, in Federal-Indian policy have created unclear responsibilities as well as various categories of Indians. Several generalizations are, however, relatively clear. Indian affairs is predominantly a Federal and not a State responsibility. The operative relationship is between the Federal Government and the tribal government. On the Federal side, the power is constitutionally assigned to Congress; however, until recently very few of the health-related statutes have contained specific congressional directives on how they should be implemented. This situation has long favored decisionmaking and policy development by the administrators of Indian programs. For most of the history of Federal-Indian relationships, the power of administrators was not able to be legally challenged by dependent Indian tribes. Only in the last several decades has litigation begun to define the perimeters of agency power.

The trustee role adopted by the Federal Government has its origins in more than the United States being the technical legal owner of Indian land. Among other roles, the Federal Government was to protect tribes against non-Indians (States) and to provide necessary services. The operative documents for determining the scope of the Federal responsibility in any given situation are the treaties and statutes. In situations where the statutes or treaties are unclear, the courts have developed special rules of interpretation—rules that give the most favorable interpretation or construction to the Indian parties.

With the exception of specific congressional directives, whatever rights exist for individual Indians in the Federal-Indian relationship are derived from membership in a federally recognized tribe, even though it is not always clear how some tribes became federally recognized and others did not. Federal recognition is the key ingredient for access to most Federal services that are provided on the basis of the Federal-Indian relationship. Although Congress has the power to determine who is eligible for benefits, it expresses that power infrequently and has usually deferred that determination to the executive branch.

As noted, for the most part rights within the Federal-Indian relationship derive from an individual Indian's membership in a federally recognized tribe. The definition of that membership is a tribal prerogative. Although Congress routinely uses the tribal membership definition, it can add additional definitions, or use specific definitions of Indian eligibility for specific programs. Courts will defer to these congressional determinations as long as they have the overall purpose of furthering the Federal-Indian relationship. It is important to distinguish, however, whether Congress is or is not acting pursuant to the Federal-Indian relationship. There are many Federal statutes that may provide services to individuals who are defined as Indian for the purposes of the particular statute but who are not Indians for purposes of the Federal-Indian relationship.

In addition to the issue of what definition Congress is adopting for the provision of services, is the issue of agency discretion to modify, expand, or limit the congressional definition. Where Congress has provided no definition, what is the scope of agency discretion to create service eligibility criteria that in effect define Indians for that particular service? To date, litigation has addressed these questions in only a limited fashion. *Mor-*

ton v. *Ruiz* (89) is probably the leading case. It evaluated the agency determination of service eligibility by determining if the agency action had any "rational basis."

Reid Chambers, formerly the Associate Solicitor for Indian Affairs at the Department of the Interior, in his classic 1975 article on the trust responsibility (18), came to the conclusion that it is unlikely that the judiciary would, in the absence of a specific treaty, agreement, or statute, find the social services provided by the Federal Government to be a trust obligation to Indians. An exception is perhaps provided, he reasoned, where the denial of services is so extreme that a right somewhat analogous to "the right of treatment" developed in prisoners' rights cases may arise.

Several factors existing at the time of the Chambers article invariably led to such conclusions. No case had held that the trust responsibility required that social services be provided. The one case in point at the time was the 1970 decision in *Gila River Pima Maricopa Indian Community* v. *United States* (37), which held that the United States had no legally enforceable duty in the absence of a specific provision in a treaty, statute, or other legally controlling document. In addition to cases that directly consider the scope of the trust obligation, another factor was the plenary power doctrine. Pursuant to the plenary power doctrine, the courts defer to congressional judgments in Indian affairs; this deferral had permitted Congress to unilaterally alter, modify, or eliminate the Federal Government's obligations to Indians.

The judiciary had been clinging to the narrow role that had been defined for it in the 1903 classic case on congressional plenary power, *Lone Wolf* v. *Hitchcock* (66a). *Lone Wolf* had stood for the proposition that Congress has extraordinary power in Indian affairs and that the judiciary, while it will interpret the actions of Congress, will only rarely scrutinize on a constitutional basis the exercise of the power of Congress. In *Lone Wolf*, the Kiowas and Comanches had by treaty with the United States provided for a specific mechanism to control the sale of Indian lands. Congress subsequently enacted a statute containing a process different from that in the treaty. The tribes sued to have the land sales set aside for violating the treaty. Allegations of fraud were also made by the tribes. The Supreme Court refused to look behind the action of Congress in passing the statute, but, fortunately for the complaining tribes, also held that the statute had abrogated the treaty.

The *Lone Wolf* doctrine has been somewhat modified in recent years (127). The two modifying cases are *Delaware Tribal Business Committee* v. *Weeks* (28a), where the Supreme Court reached the merits of a due process challenge, and *United States* v. *Sioux Nation* (125a), where the Supreme Court indicated that it would determine in what capacity the United States was acting, rather than following the conclusive presumption in *Lone Wolf* of congressional good faith. *Weeks* requires that congressional efforts to affect its trust obligation to Indian tribes must be rationally tied to its "unique (trust) obligation." *Sioux Nation* found the United States to be exercising the traditional function of a trustee and therefore held the United States to the usual standards of a traditional trustee. These modifications, which involve the utilization of constitutional standards analogous to those standards used in equal protection/due process analyses, have potential implications for any definition of the Federal Government's health obligation to Indians. For if Congress is to be held to any constitutional standard of fairness that ties the scope of its responsibilities to the purpose of its obligation—e.g., to benefit Indians—then the executive branch must be held to at least as stringent a standard in determining the scope of its authority.

There has been only one case, *White* v. *Califano* (212), that considered directly the Federal Government's obligation to provide health services. *White* v. *Califano*, like most cases, has a unique factual and jurisdictional setting, in which the court answered a relatively narrow question. An indigent Indian residing on the Pine Ridge Reservation in South Dakota was held to be incompetent by the Pine Ridge Tribal Court. The tribal court then entered an order seeking to have the "incompetent Indian" committed to a South Dakota State mental institution. South Dakota refused to accept the patient, arguing that under applicable Federal law, it lacked jurisdiction over her and could not take custody. South Dakota also asserted that an "incompetent" Indian was the responsibility of the Federal Government. The United States had also refused to provide any services to the patient. Her guardians sued the United States and South Dakota to provide services. Interestingly, the U.S. Government viewed the case as primarily one of a State violating the "civil rights" of an individual Indian, and the case was in large part the responsibility of the Civil Rights Division of the Department of Justice. The Justice Department used the same conceptual argument on dual entitlement contained in the President's veto message on the Indian Health Care Improvement Act amendments.

White v. *Califano* does not settle the issue of primary versus secondary responsibility, since the eighth circuit sustained South Dakota's assertion that it lacked jurisdiction over incompetent Indians and as such could not provide custodial services. The court rejected the argument that the United States had no duty to provide facilities for mental health and found that instead the United States had the duty to provide care under its trust responsibility and, specifically, that it was pursuant to the Indian Health Care Improvement Act.

White v. *Califano* has been criticized by at least one Indian commentator, Pine Ridge Tribal Judge Mario Gonzalez (40). Judge Gonzalez does not accept the analysis that begins with Indians being State citizens; he argues that even though Indians became U.S. citizens in 1924, it is not necessary for them to be State citizens to enjoy constitutional protections. He argues that under the full faith and credit clause of the constitution, South Dakota should have accepted the tribal court decree and provided services. He also notes that South Dakota mental health services were in any event 68 percent federally funded. The attempt of the Federal Government to evade its responsibilities also was severely criticized by Judge Gonzalez.

If *White* v. *Califano* is followed, an eligible Indian who has no other alternative probably would not be denied health services by the Federal Government. Any award of damages under present law would seem to require specific statutory authorization. However, where breaches are provable, equitable relief should be available against the appropriate Federal agency and its officials.

White v. *Califano* was also cited by the judge in the 1986 *McNabb* v. *Heckler, et al.* (82) decision discussed above, where an alternative source of payment, Roosevelt County, was available. The judge stated that:

> . . . the court believes that the real importance of *White* lies in its extended discussion of the (F)ederal Government's trust responsibility to Indians. Further, this court believes that the trust analysis employed in *White* was equally responsible for the result reached therein, to be accorded equal footing with the court's conclusion that local governments had no authority to involuntarily commit mentally ill Indian persons (82).

Whatever difficulties the legal profession may have in defining the perimeters of the trust obligation, it is within Congress' powers to define those perimeters, and Indian people have consistently maintained that health care is part of the trust obligation of the United States. According to a report in the mid-1970s by the American Indian Policy Review Commission (130):

> Indian people are unanimous and consistent in their own view of the scope of the trust responsibility. Invariably they perceive the concept to symbolize the honor and good faith, which historically the United States has always professed in its dealings with the Indian tribes. Indian people have not drawn sharp legal distinctions between services and custody of physical assets in their understanding of the applications of the trust relationship.

Chapter 3

Overview of the Current Indian Population

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Chapter 3

Overview of the Current Indian Population

INTRODUCTION

The number of American Indians, Eskimos, and Aleuts identified by the U.S. Bureau of the Census and Bureau of Indian Affairs (BIA) is far fewer than the number, perhaps 10 million, who are thought to have been living in North America at the time of its discovery by the Europeans. Westward expansion (85), contact with disease, wars, and other scourges reduced the number of Indians by 90 percent within a century after Columbus arrived (71). Little recovery has been made by Indians in the United States in rebuilding the population as shown by records kept by government agencies. In 1890, there were approximately 274,000 Indians, Eskimos, and Aleuts in this country. Fifty years later, in 1940 the population had grown by almost 34 percent to 366,000 (see table 3-1). In the 1980 Census of Population, which used improved techniques for counting people, 1.4 million Indians, Eskimos, and Aleuts were self-identified—almost quadrupling the 1940 count. The blood quantum of these self-identified Indians, however, is not known. While most Indian tribes have a minimum blood quantum requirement for membership, the Bureau of the Census' definition of race does not denote any clear-cut scientific definition of biological stock. In the 1980 census, 6.7 million persons identified their ancestry as American Indian and 51,000 persons identified themselves as being of Aleut or Eskimo ancestry (these figures include persons who reported single and multiple ancestry groups) (150). (Race and ancestry are separate characteristics; persons reporting a particular (or multiple) ancestry may be of any race.)

Table 3-1.—Indian Population in the United States, Decennial Census Enumerations and BIA Estimates, Selected Years 1890-1980

Year	U.S. Census enumeration	Alaska Natives	BIA estimate
1890	248,253	25,354	248,300
1900	237,196	29,536	270,500
1910	265,683	25,331	305,000
1920	244,437	26,558	336,300
1930	332,397	29,983	340,500
1940	333,969	32,458	360,500
1950	343,410	35,047	421,600
1960	551,669[a]	—	344,951[b]
1970	827,268[a]	—	477,458[c]
1980	1,423,043[a]	—	734,895[d]

[a] Includes Eskimos and Aleuts, they are in a separate column prior to 1960 as Alaska was granted statehood in 1959.

[b] From BIA, "Indian population, April 1, 1960," July 1961.

[c] From the BIA report, "Indian Population On and Near Reservations," March 1970.

[d] From the BIA report, "Indian Service Population and Labor Force Estimates, December 1981," January 1982.

BIA figures represent local resident service population.

SOURCES: Except where noted U.S. Department of Health, Education, and Welfare, Public Health Service, "Health Services for American Indians," Washington, DC, Feb. 11, 1957, verified by the U.S. Census Bureau on Nov. 11, 1985; and U.S. Bureau of the Census, PC80-S1-13, 1984.

This chapter explains the U.S. Bureau of the Census compilation of statistics on Indians, Federal agencies' use of Indian data, a demographic review of the Indian population, and 100-year projections of the future Indian population. In this chapter, the term "Indians" includes American Indians, Eskimos, and Aleuts except when referring to population characteristics gathered in the 1970 census, which pertain only to American Indians. "Reservation Indians" includes American Indians, Eskimos, and Aleuts living on identified American Indian reservations or identified historic areas of Oklahoma (excluding urbanized areas).

SOURCES OF ESTIMATES OF THE SIZE OF THE INDIAN POPULATION

There are at least as many definitions of who is an Indian as there are Federal agencies whose constituencies include Indians. Since one of these agencies, the U.S. Bureau of the Census, actually counts all the people in this country every 10 years, it is agreed that this agency's count of the number of Indians is generally the most reliable measure. Even so, tribes and Federal, State, and local agencies have serious disagreements over the accuracy of the census count. In large measure, such disagreements reflect concerns about funding. Because funding for major Federal and State programs—including revenue sharing, community development block grants, home energy assistance, and various social programs—is keyed largely to population, and administering agencies use census figures to define service populations, differences in population estimates can be critical.

One reason that varying estimates of the size of the Indian population are controversial is that Federal agencies and individual tribes use different definitions of "Indian." Many differences in the operational definitions of "Indian" can be resolved only through changes in authorizing legislation in which definitions are set forth. Changes in authorizing legislation would arouse significant disputes and bring out many opposing views. Because the economic and philosophic stakes are so high, it is not likely that laws will be revised to achieve a consistent definition of "Indian" that can be applied universally.

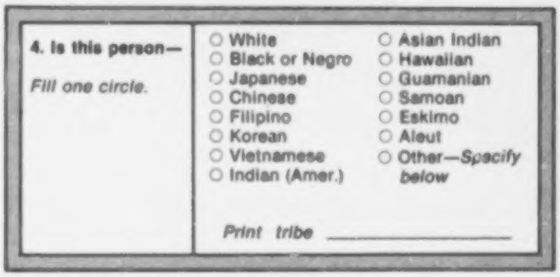
U.S. Bureau of the Census Estimates

In 1980, for the first time, the Bureau of the Census relied on self-identification, which allowed individuals themselves to choose the racial group with which they most identified. In the 1970 census, race had been determined "on the basis of observation by enumerators in rural areas of the country, including most reservations" (148).

Two questionnaires were used in the 1980 census; a "short form" with questions asked of all housing units/households, and a "long form" with additional questions. Both forms included the question regarding race from which the Bureau of the Census tabulated the Indian population. The long form, which was administered randomly to 80 percent of all housing units/households, included a separate question on ancestry (see figure 3-1).

Figure 3-1.—Facsimiles of Race and Ancestry Questions[a]: 1980 U.S. Census

ASKED OF ALL HOUSEHOLDS



4. Is this person—

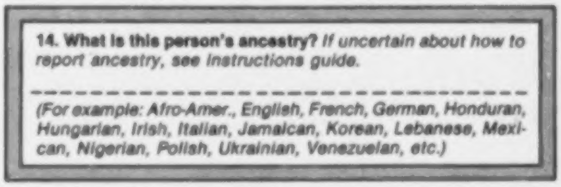
Fill one circle.

○ White
○ Black or Negro
○ Japanese
○ Chinese
○ Filipino
○ Korean
○ Vietnamese
○ Indian (Amer.)

Print tribe ____________

○ Asian Indian
○ Hawaiian
○ Guamanian
○ Samoan
○ Eskimo
○ Aleut
○ Other—*Specify below*

ASKED OF SAMPLE HOUSEHOLDS



14. What is this person's ancestry? *If uncertain about how to report ancestry, see instructions guide.*

- -

(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

[a] Ancestry and race are separate characteristics. Persons reporting a particular ancestry may be of any race.

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1980 Census of the United States, Leaflet showing the content of the two questionnaires used in the Census of population and housing.

For respondents who left the race question blank on the 1980 census questionnaire, the reported race of other members of the household was used. Additionally, if race was not reported for any member of the household, the race of a householder in a previously processed household was assigned by computer. Persons who did not check one of the specific race categories but wrote in the name of an American Indian tribe, "Canadian Indian," "French-American Indian," or "Spanish-American Indian" were counted as American Indians. Responses to the ancestry question on the 1980 questionnaires yielded a significant number of persons who regarded themselves to be ethnically Indian. Like race, ancestry was ascertained by self-identification, so responses reflected the ethnic group with which individuals identified regardless of the number of generations removed from their ancestor(s).

It is widely held that both the 1970 and 1980 censuses undercounted the population of American Indians, Eskimos, and Aleuts for many age groups; and the count was particularly poor in some geographic areas. Critical discussions of the Indian undercount in the 1980 census and whether the American Indian, Eskimo, and Aleut count is accurate generally fall into two categories: 1) that intercensal measures of population change are unreliable, and 2) that the enumeration techniques used by the Bureau in the census are inadequate. According to the census, the American Indian population grew by 72 percent between 1970 and 1980. If one assumes that the 1970 count was accurate, however, the natural increase (i.e., the effect of American Indian births and deaths) yields a number that is lower than the 1980 count. The same inconsistency occurred between 1960 and 1970 (97).

One intercensal measure adjusts for the natural increase in population using data from the National Center for Health Statistics (NCHS). Shortcomings inherent in this method are that Indian births and deaths are undercounted. States do not record paternal race if a birth has occurred out of wedlock. Therefore, children born out of wedlock to an Indian father and non-Indian mother will not be included in the count of Indian births unless an Indian father has acknowledged paternity. Indian deaths are underreported in many States, most notably in California, in part because of the difficulty in distinguishing Indians from individuals of other races and ethnic heritages such as Hispanics.

In addition to counting Indians, the census also distinguishes between Indians living inside "identified areas" and Indians living elsewhere. An identified area includes reservations, tribal trust lands, Alaska Native villages, and historic areas of Oklahoma (which consist of the former reservations having legally established boundaries between 1900 and 1907, excluding urbanized areas). The boundaries of identified areas used in the census are those established by treaty, statute, executive order, or court order for federally and State-recognized tribes. In 1970, 115 reservations were identified. In 1980, 278 reservations and 209 Alaska Native villages were identified. Table 3-2 shows the American Indian population living on and off reservations or identified tribal trust lands by State, and figure 3-2 shows the total distribution for 1980.

Indian Health Service Estimates

A second source of population estimates frequently cited is that of the Indian Health Service (IHS), which computes its service population based on figures from the 1980 census as reported by county. The IHS service population consists of American Indians, Eskimos, and Aleuts (who identified themselves as such in the 1980 census) living within the geographic areas that define where IHS has responsibilities. These geographic areas are counties within reservation States having the reservation of a federally recognized tribe within or contiguous to its borders. This concept of geographic proximity is referred to as "on or near" a federally recognized reservation. A "reservation State" is a State in which IHS has responsibilities; not all States in the United States are considered "reservation States." The reservation must be federally recognized (there are tribes with land holdings that have State recognition only). The 32 reservation States as of 1985 are listed in table 3-3. Local administrative units within IHS area offices are known as service units. For attributing population to specific service units when service units cross county lines, estimates are made by field administrators as to the number of individuals within each county to include in the service unit. These proportions, which are from the 1980 census, are applied to all subsequent estimates. IHS adjusts its population estimates annually for the natural increase only, using the most recently available data on Indian births and deaths from NCHS. As previously noted, these Indian births and deaths are undercounted by States. In some States the undercount may be significant. Except where noted, the Office of Technology Assessment (OTA) has used IHS's 1985 estimates of its service population throughout this report.

Bureau of Indian Affairs Estimates

A third population estimate, from BIA, identifies local resident population, but as in the case of the IHS service population does not necessarily refer to tribal membership. According to BIA's Office of Financial Management, local BIA agencies estimate population figures and labor force participation using "whatever information may be available for the reservation. Accuracy varies from place to place; it is relatively high at small, isolated locations where everyone's activity is common knowledge" (208). "Data for the Navajo Area, the State of Oklahoma (Anadarko and Muskogee Areas), and the State of Alaska are

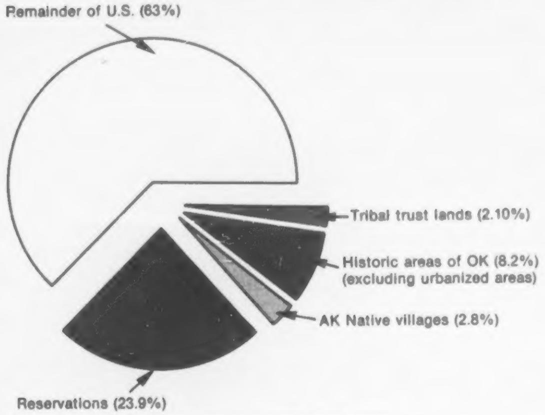
Table 3-2.—American Indian Population Living On and Off Reservations or Identified Tribal Trust Lands, by State, 1980

		Number				Percent		
States	All races	American Indian	On reservation	On trust lands	Off reservation or trust lands	On reservation	On trust lands	Off reservation or trust lands
West:								
Alaska	401,851	21,869 42,234[a]	942	—	20,927	4.3%	—	95.7%
Arizona	2,718,215	152,498	113,763	465	38,270	74.6	0.3%	25.1
California	23,667,902	198,275	9,265	77	188,933	4.7	—	95.3
Colorado	2,889,964	17,734	1,966	—	15,768	11.1	—	88.9
Hawaii	964,691	2,655	—	—	2,655	—	—	100.0
Idaho	943,935	10,418	4,771	3	5,644	45.8	—	54.2
Montana	786,690	37,598	24,043	1	13,544	63.9	—	36.0
Nevada	800,493	13,306	4,400	339	8,567	33.1	2.5	64.4
New Mexico	1,302,894	107,338	61,876	21,556	23,906	57.6	20.1	22.3
Oregon	2,633,105	26,591	3,072	12	23,507	11.6	—	88.4
Utah	1,461,037	19,158	6,868	17	12,273	35.8	0.1	64.1
Washington	4,132,156	58,186	16,440	310	42,436	28.3	0.5	71.2
Wyoming	469,557	7,057	4,159	—	2,898	58.9	—	41.1
South:								
Alabama	3,893,888	7,502	—	—	7,502	—	—	100.0
Arkansas	2,286,435	9,364	—	—	9,364	—	—	100.0
Delaware	594,338	1,307	—	—	1,307	—	—	100.0
District of Columbia	638,333	996	—	—	996	—	—	100.0
Florida	9,746,324	19,134	1,303	—	17,831	6.8	—	93.2
Georgia	5,463,105	7,442	30	—	7,412	0.4	—	99.6
Kentucky	3,660,777	3,518	—	—	3,518	—	—	100.0
Louisiana	4,205,900	11,969	210	185	11,574	1.8	1.5	96.7
Maryland	4,216,975	7,823	—	—	7,823	—	—	100.0
Mississippi	2,520,638	6,131	2,756	410	2,965	45.0	6.7	48.4
North Carolina	5,881,766	64,536	4,844	—	59,692	7.5	—	92.5
Oklahoma	3,025,290	169,292	4,749	—	164,543	2.8	—	97.2
South Carolina	3,121,820	5,665	728	—	4,937	12.9	—	87.1
Tennessee	4,591,120	5,013	—	—	5,013	—	—	100.0
Texas	14,229,191	39,740	859	—	38,881	2.2	—	97.8
Virginia	5,346,818	9,211	118	—	9,093	1.3	—	98.7
West Virginia	1,949,644	1,555	—	—	1,555	—	—	100.0
Midwest:								
Illinois	11,426,518	15,846	—	—	15,846	—	—	100.0
Indiana	5,490,224	7,682	—	—	7,682	—	—	100.0
Iowa	2,913,808	5,369	492	—	4,877	9.2	—	90.8
Kansas	2,363,679	15,256	715	—	14,541	4.7	—	95.3
Michigan	9,262,078	39,734	1,607	183	37,944	4.0	0.5	95.5
Minnesota	4,075,970	34,831	9,901	218	24,712	28.4	0.6	70.9
Missouri	4,916,686	12,129	—	—	12,129	—	—	100.0
Nebraska	1,569,825	9,145	2,846	—	6,299	31.1	—	68.9
North Dakota	652,717	20,120	11,287	1,753	7,080	56.1	8.7	35.2
Ohio	10,797,630	11,985	—	—	11,985	—	—	100.0
South Dakota	690,768	44,948	28,468	4,657	11,823	63.3	10.4	26.3
Wisconsin	4,705,767	29,320	9,361	79	19,880	31.9	0.3	67.8
Northeast:								
Connecticut	3,107,576	4,431	27	—	4,404	0.6	—	99.4
Maine	1,124,660	4,057	1,235	—	2,822	30.4	—	69.6
Massachusetts	5,737,037	7,483	1	—	7,482	—	—	100.0
New Hampshire	920,610	1,297	—	—	1,297	—	—	100.0
New Jersey	7,364,823	8,176	—	—	8,176	—	—	100.0
New York	17,558,072	38,967	6,734	—	32,233	17.3	—	82.7
Pennsylvania	11,863,895	9,179	—	—	9,179	—	—	100.0
Rhode Island	947,154	2,872	—	—	2,872	—	—	100.0
Vermont	511,456	968	—	—	968	—	—	100.0
Total United States	226,545,805	1,366,676	339,836	30,265	996,575	24.9%	2.2%	72.9%

[a] Eskimos and Aleuts residing in Alaska. An additional 14,133 Eskimos and Aleuts live outside of Alaska and are not included in this table.

SOURCE: U.S. Bureau of the Census, PC80-S1-13, 1984.

Figure 3-2.—Distribution of the American Indian, Eskimo, and Aleut Population, 1980
(Inside and outside identified areas and villages)



SOURCE: U.S. Bureau of the Census, PC80-S1-13, 1984.

Table 3-3.—32 Reservation States as of 1985

Alabama
Alaska
Arizona
California
Colorado
Connecticut
Florida
Idaho
Iowa
Kansas
Louisiana
Maine
Michigan
Minnesota
Mississippi
Montana
Nebraska
Nevada
New Mexico
New York
North Carolina
North Dakota
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Dakota
Texas
Utah
Washington
Wisconsin
Wyoming

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, 1985.

considered the least accurate and the most difficult to estimate because of the large population scattered over large geographic areas" (208). The primary purpose of BIA's population publication is for the information it contains on employment and earnings on Indian reservations.

Appendix A summarizes 1980 U.S. census, IHS, and BIA estimates of the Indian population organized by IHS area, along with tribal estimates when available. The fourth column of appendix A has been included to show tribal versions of population that OTA received from some tribes or from enrollment figures provided by BIA. Apparent discrepancies exist between what some tribes may claim their population to be and what the Bureau of the Census and BIA report. IHS does not compute service population by tribe but has provided OTA with a list of tribes served by each of its service units.

Implications of Varying Estimates

The discrepancies in population size are attributed largely to the varying definitions of "Indian" that are used by each of these sources. Such definitions are included in regulations governing BIA, IHS, and other governmental programs serving Indians. Moreover, many tribes maintain rolls separately from those kept by BIA and its local agencies.

A major difference between tribal rolls and census or BIA estimates is that many tribes count individuals without regard to their residence. The tribal rolls list full-fledged members, and may include others who are enrolled but do not have the full privileges of members such as voting rights or rights to share in tribal benefits such as occasional per capita payments. The 1980 census supplementary survey of Indians living on reservations found that 87 percent were enrolled in their tribe (152). According to Vine Deloria, a contemporary Indian social theorist, the passage of the Indian Reorganization Act and the Oklahoma Indian Welfare Act in 1934 and 1936 made certain Federal services available to tribal members that had not been available in previous decades, and tribes may have developed special categories of tribal membership to enable more individuals to become eligible for some of these Federal services (29).

One of the reasons that IHS regulations extend eligibility to nonmembers of tribes is in recognition of the variations across tribes in the requirements for tribal membership. Tribal rolls may be closed and reopened infrequently, a situation that would make it difficult for Indians who are not on their tribal rolls to prove their eligibility if membership were the sole criterion for services from IHS. Tribal edict or personal choice (for political reasons, some individuals choose not to be members of their tribes) keep many Indians from becoming members of their tribes. Though tribal membership requirements are not uniform across the United States and in some cases may not seem fair to the individuals concerned, when challenged, courts have consistently upheld the sovereign right of tribes to determine their own rules governing membership.

Having an accurate estimate of the number of Indians, especially those living within or in close proximity to reservations, is necessary for planning of services delivery, allocating resources to provide services, and eventually for detecting whether the services provided have had any impact. The size of a given population being served is generally a good indicator of the expected demand for the services being offered, but within the IHS system, demand for health care varies considerably by area and is not necessarily related to its estimated population size (see ch. 5). IHS previously estimated its service population without regard to actual users of its services, but a patient registration system instituted in January 1984 now accounts for current users of IHS services and should improve IHS's use of population data for planning purposes.

CHARACTERISTICS OF THE AMERICAN INDIAN, ESKIMO, AND ALEUT POPULATIONS

The most important point to be made about the Indian population in the United States is that each Indian tribe has its own unique culture, history, geography, and demography. No single variable or socioeconomic indicator encompasses the diverse characteristics of Indians and Alaska Natives in this country.

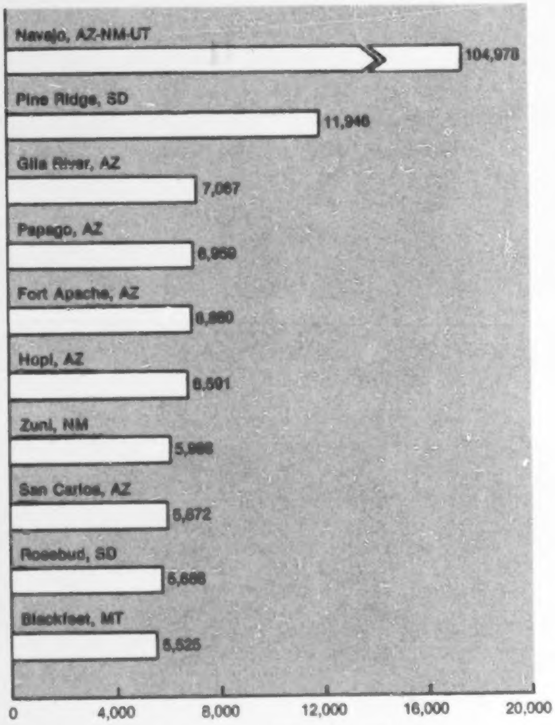
The characteristics presented here, which are drawn from census reports, are based on a sample and are therefore subject to errors. These descriptive statistics are also limited by the fact that they are national aggregates. National measures of the Indian population and the U.S. all races population may not accurately describe local conditions nor reflect changing situations, since they are collected at one point in time. (For a more complete discussion of the sources of statistical error in census data, see the "Accuracy of Data" appendix in any of the Bureau of the Census' subject reports.)

Characteristics cited in this section are for Indians throughout the United States except where certain subpopulations are specified. "Reservation Indians," for example, include Indians on identified reservations and in historic areas of Oklahoma (excluding urbanized areas).

The size of the Indian population living on reservations in 1980 ranged from 104,978 on the Navajo reservation to 0 on 21 reservations. The Pine Ridge Reservation of the Oglala Sioux had 11,946 Indian persons. The Blackfeet, Montana; Fort Apache, Gila River, Hopi, Papago, and San Carlos reservations of Arizona; Rosebud, South Dakota, and Zuni, New Mexico each had more than 5,500 Indian residents, or 14.8 percent of all reservation Indians when combined. The 10 most populous reservations had 49 percent of all reservation Indians (see figure 3-3).

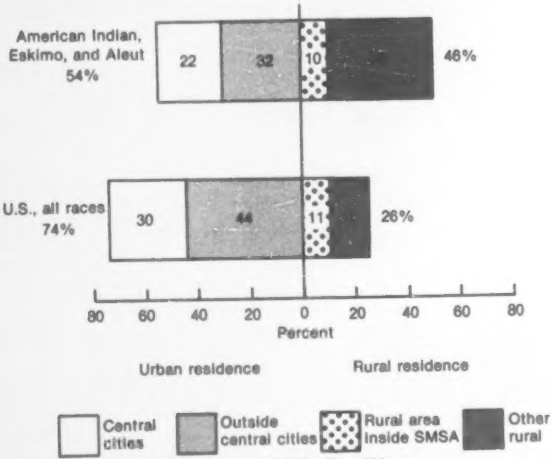
The Indian population is residing in urban areas more than ever before. As of 1980, 22 percent of the Indian, Eskimo, and Aleut population lived in central cities, 32 percent lived in urbanized areas outside central cities, and the remaining 46 percent chose nonmetropolitan residences (see figure 3-4). In 1970, 19.9 percent of American Indians lived in central cities, 25 percent in other urban areas, and 55.1 percent in rural areas. The 10 Standard Metropolitan Statistical Areas (SMSAs) having the largest number of Indians, Eskimos, and Aleuts in 1980 (in descending order) were Los Angeles-Long Beach, Tulsa, Oklahoma City, Phoenix, Albuquerque, San Francisco-Oakland, Riverside-San Bernardino-Ontario, Seattle-Everett, Minneapolis-St. Paul, and Tucson (see figure 3-5). Each of these cities has an urban Indian health program with IHS funding, though their level of services may vary. Table 3-4 shows the distribution of Indians by urban or rural residence and sex as well as the total number of persons of all races for each State. The Eskimo and Aleut population has begun a similar shift away from their traditional homelands, though the majority, 74 percent, of all Eskimos and Aleuts still lived in Alaska in 1980 (see figure 3-6).

Figure 3-3.—Ten Reservations With Highest Number of Indians, 1980



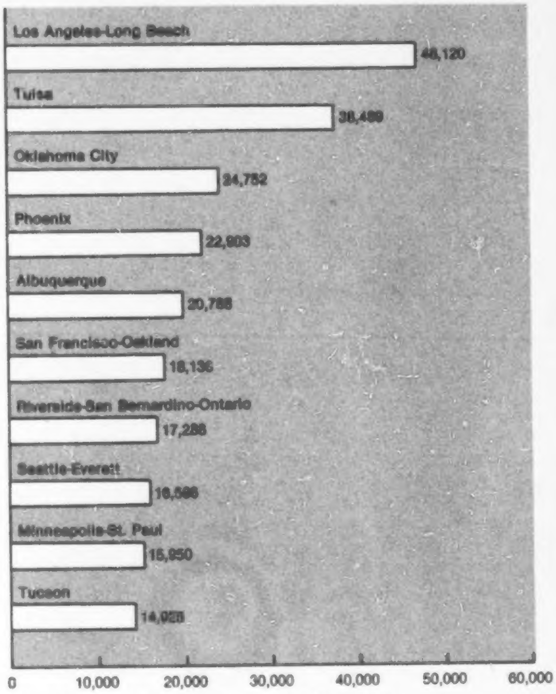
SOURCE: U.S. Bureau of the Census, PC80-S1-13, 1984.

Figure 3-4.—Urban and Rural Residence for American Indian, Eskimo, and Aleut Populations, 1980



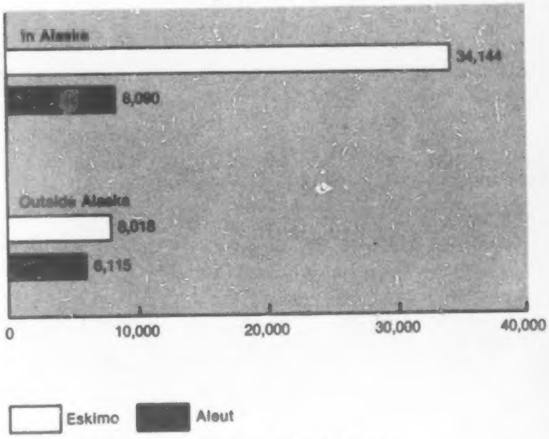
SOURCE: U.S. Bureau of the Census, PC80-1-C1, 1983.

Figure 3-5.—Ten SMSAs With the Highest Numbers of American Indians, Eskimos, and Aleuts, 1980



SOURCE: U.S. Bureau of the Census, PC80-1-B1, 1983.

Figure 3-6.—Distribution of the Eskimo and Aleut Population, 1980



SOURCE: U.S. Bureau of the Census, PC80-S1-13, 1984.

Table 3-4.—American Indians, Eskimos, and Aleuts, by State, Urban/Rural Residence, and Sex, 1980

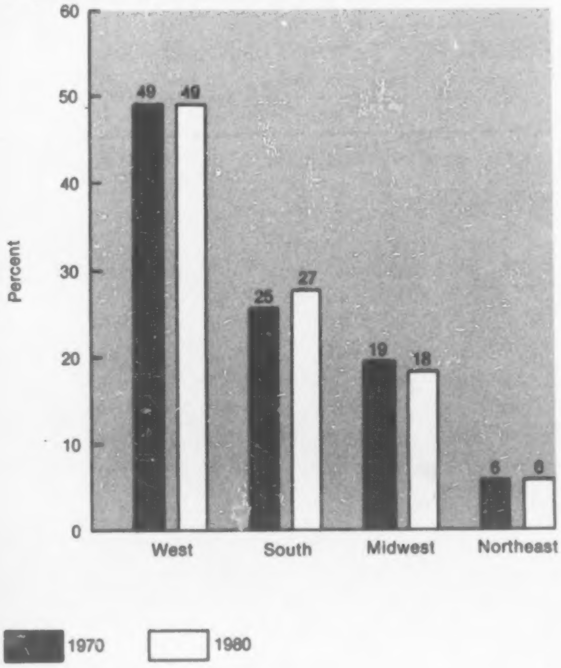
		American Indians, Eskimos, and Aleuts						
		Urban		Rural		Total urban and rural		
States	U.S., all races	Male	Female	Male	Female	Male	Female	Both sexes
Alabama	3,893,888	1,674	1,654	2,149	2,097	3,823	3,751	7,574
Alaska	401,851	9,211	10,393	23,331	21,168	32,542	31,561	64,103
Arizona	2,718,215	23,069	25,127	51,328	53,221	74,397	78,348	152,745
Arkansas	2,286,435	2,117	2,276	2,492	2,526	4,609	4,802	9,411
California	23,667,902	80,323	83,855	19,115	18,076	99,438	101,931	201,369
Colorado	2,889,964	6,671	6,440	2,556	2,401	9,227	8,841	18,068
Connecticut	3,107,576	1,826	1,889	413	399	2,239	2,288	4,527
Delaware	594,338	225	243	416	423	641	666	1,307
District of Columbia	638,333	479	552	—	—	479	552	1,031
Florida	9,746,324	7,243	7,043	2,606	2,341	9,849	9,384	19,233
Georgia	5,463,105	2,530	2,162	1,548	1,376	4,078	3,538	7,616
Hawaii	964,691	1,311	1,046	193	196	1,504	1,242	2,746
Idaho	943,935	1,683	1,763	3,521	3,544	5,204	5,307	10,511
Illinois	11,426,518	6,985	7,081	1,111	1,106	8,096	8,187	16,283
Indiana	5,490,224	2,702	2,771	1,210	1,142	3,912	3,913	7,825
Iowa	2,913,808	1,911	2,012	773	745	2,684	2,757	5,441
Kansas	2,363,679	5,460	5,430	2,251	2,211	7,711	7,641	15,352
Kentucky	3,660,777	1,259	972	655	705	1,914	1,677	3,591
Louisiana	4,205,900	3,125	2,943	3,086	2,900	6,211	5,843	12,054
Maine	124,660	717	736	1,317	1,287	2,034	2,023	4,057
Maryland	4,216,975	3,314	3,343	681	672	3,995	4,015	8,010
Massachusetts	5,737,037	2,993	3,090	800	853	3,793	3,943	7,736
Michigan	9,262,078	12,553	13,048	7,269	7,180	19,822	20,228	40,050
Minnesota	4,075,970	9,883	10,563	7,338	7,232	17,221	17,795	35,016
Mississippi	2,520,638	732	678	2,305	2,431	3,037	3,109	6,146
Missouri	4,916,686	3,957	3,987	2,209	2,168	6,166	6,155	12,321
Montana	786,690	4,640	5,170	13,808	13,652	18,448	18,822	37,270
Nebraska	1,569,825	2,301	2,459	2,217	2,210	4,518	4,669	9,187
Nevada	800,493	3,959	4,131	2,645	2,554	6,604	6,685	13,289
New Hampshire	920,610	365	334	344	295	709	629	1,338
New Jersey	7,364,823	3,389	3,536	748	695	4,137	4,231	8,368
New Mexico	1,302,894	14,699	16,732	36,328	38,354	51,027	55,086	106,113
New York	17,558,072	12,854	14,738	6,323	5,667	19,177	20,405	39,582
North Carolina	5,881,766	7,161	7,175	24,909	25,407	32,070	32,582	64,652
North Dakota	652,717	2,014	2,129	7,940	8,060	9,954	10,189	20,143
Ohio	10,797,630	4,623	4,804	1,442	1,361	6,065	6,165	12,230
Oklahoma	3,025,290	40,450	43,619	42,399	42,981	82,849	86,600	169,449
Oregon	2,633,105	7,863	8,099	5,707	5,645	13,570	13,744	27,314
Pennsylvania	11,863,895	3,398	3,650	1,288	1,129	4,686	4,779	9,465
Rhode Island	947,154	1,116	1,258	249	249	1,365	1,507	2,872
South Carolina	3,121,820	1,256	1,118	1,690	1,671	2,946	2,789	5,735
South Dakota	690,768	5,582	6,234	16,398	16,734	21,980	22,968	44,948
Tennessee	4,591,120	1,545	1,495	1,072	983	2,617	2,478	5,095
Texas	14,229,191	16,655	15,750	3,986	3,684	20,641	19,434	40,075
Utah	1,461,037	5,014	5,372	4,371	4,486	9,385	9,858	19,243
Vermont	511,456	142	195	329	302	471	497	968
Virginia	5,346,818	3,615	3,055	1,405	1,366	5,020	4,421	9,441
Washington	4,132,156	17,129	17,804	13,074	12,797	30,203	30,601	60,804
West Virginia	1,949,644	273	282	505	532	778	814	1,592
Wisconsin	4,705,767	6,716	7,021	7,875	7,887	14,591	14,908	29,499
Wyoming	469,557	1,052	1,038	2,470	2,518	3,522	3,556	7,078
Total United States	225,545,805	361,764	378,295	340,195	339,619	701,959	717,914	1,419,873

SOURCE: U.S. Bureau of the Census, PC80-1-B1, 1983.

Changes in the regional distribution of Indians from 1970 to 1980 were apparently minute. In the Midwest, the Indian population declined by 1 percent, and in the South, it increased by 2 percent between the 1970 and 1980 censuses. The region with the most (49 percent) Indians is the West. The South had 27 percent of the Indians in the 1980 census, the Midwest had 18 percent, and the Northeast had 6 percent (figure 3-7). (For a list of States by region, see table 3-2, above.)

Four States dominate the list of 10 States with the largest number of Indians (figure 3-8). Indian population growth between 1970 and 1980 was highest in the State of California, which grew by 118 percent to 201,489—more than doubling its Indian population in 10 years. The Indian population in California is concentrated in urban areas (81 percent). Oklahoma had the second largest increase, from 98,468 in 1970 to 169,459 in 1980.

Figure 3-7.—Percent of Total U.S. American Indian Population, by Region of Residence[a]: 1970 and 1980

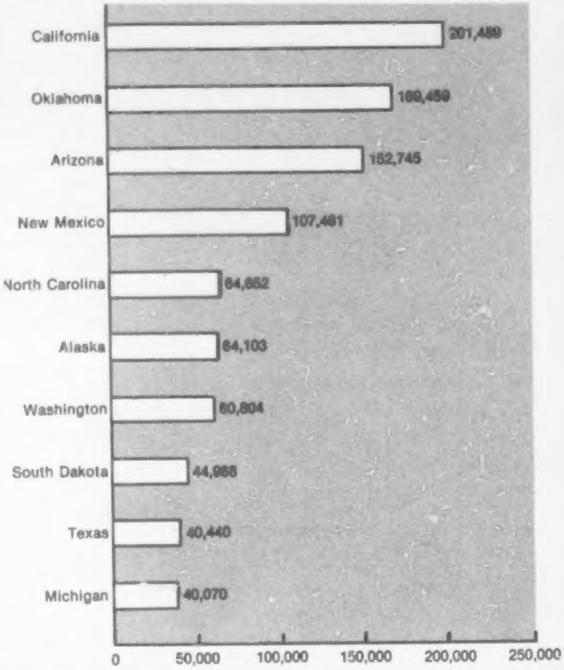


American Indian population only, excluding Eskimos and Aleuts.

[a]For a list of States by region, see table 3-2.

SOURCE: U.S. Bureau of the Census, PC(2)-1F, 1973 and PC80-S1-13, 1984.

Figure 3-8.—Ten States With the Largest American Indian, Eskimo, and Aleut Population, 1980



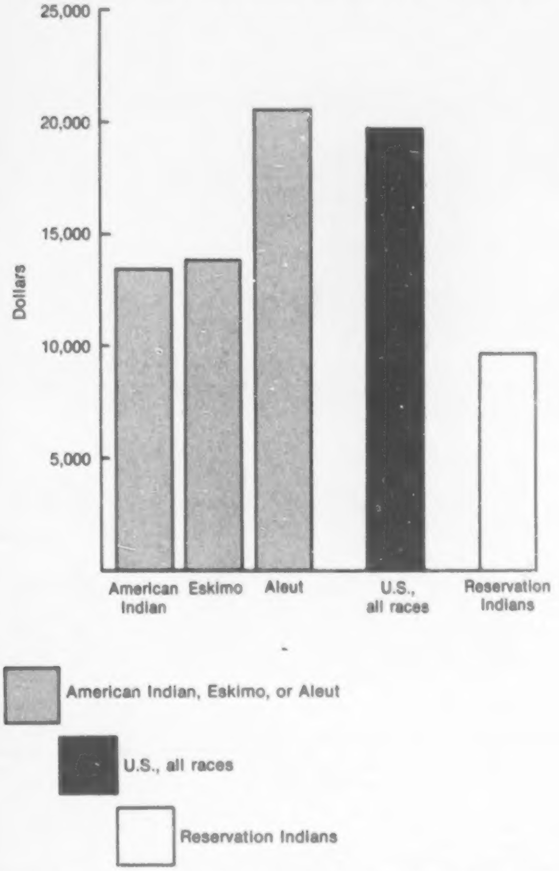
SOURCE: U.S. Bureau of the Census, PC80-S1-13, 1984.

Two other States, Arizona and New Mexico, had more than 100,000 Indians in 1980, with 152,745 and 107,481, respectively.

Median income (for American Indian families) in 1979 was $13,678, the figure was $13,829 (for Eskimo families), and $20,313 for Aleut families. Indian families living on reservations had median incomes in 1979 of $9,924. The corresponding figure for U.S. families of all races was $19,917 (see figure 3-9). (Median income is the amount at which half the people are below and half above the quoted figure.)

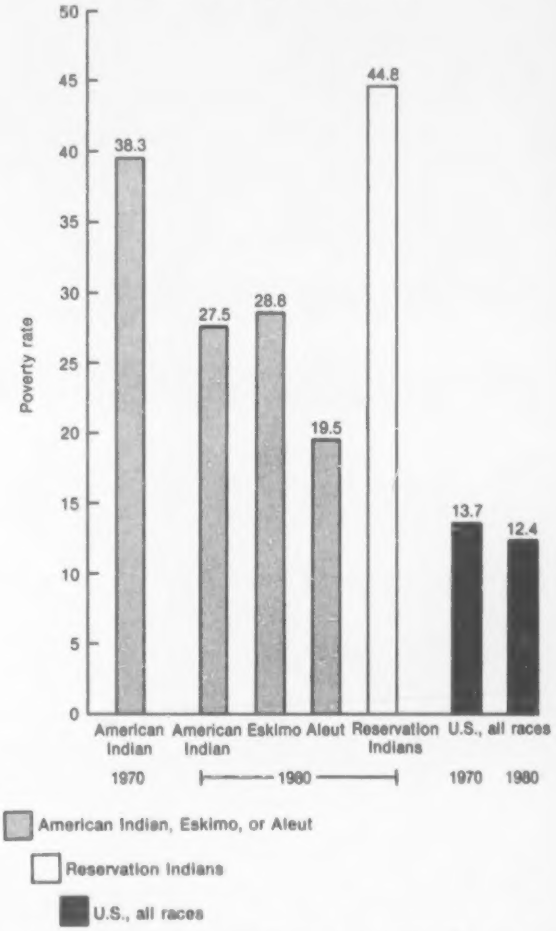
The difference in **poverty rates** (the percentage of the population whose income falls below the poverty level) between American Indians and the total population provides another example of the extent to which the U.S. all races population is better off than the Indian population. In 1980, the poverty rate for American Indian persons was 27.5, 28.8 for Eskimos, and 19.5 for Aleuts; when combined, poverty occurs at more than twice the rate of 12.4 for the U.S. all races population.

Figure 3-9.—Median Family Money Income in 1979



SOURCE: U.S. Bureau of the Census, PC80-1-C1, 1983 and PC80-2-1D, part 1, 1985.

Figure 3-10.—Poverty Rates of Persons, 1970 and 1980 (percent below poverty level)



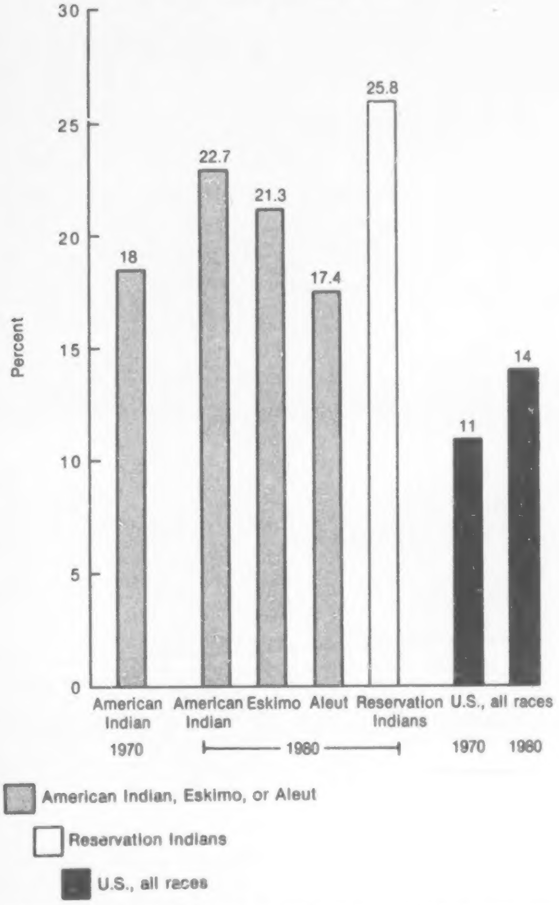
SOURCE: U.S. Bureau of the Census, PC(2)-1F, 1973; PC80-1-C1, 1983; and PC80-2-1D, part 1, 1985.

These are believed to be decreases in the poverty rates compared to 1970. Only one racial group had a higher poverty rate; 29.9 percent of all black persons reported incomes in 1979 that were below the poverty level. Poverty among Indians on reservations is significantly higher, with 44.8 percent of persons who had income in 1979 below the poverty level (see figure 3-10). (Data on poverty status are derived from responses to the Census Bureau's questions on income level in 1979. Poverty thresholds are based on income, size of household, age of householder, and the percentage of income that families spend on food. The number of individuals below the poverty level is the sum of related and unrelated persons in families with incomes below the poverty level.)

The number of ***families maintained by women***, which may be related to changes in poverty status, rose between 1970 and 1980 in the United States and among Indians. In 1980, for the U.S. all races population, 14 percent of all families were maintained by women, whereas 22.7 percent of American Indian families, 21.3 percent of Eskimo families, 17.4 percent of Aleut families, and 25.8 percent of reservation families were maintained by women (see figure 3-11).

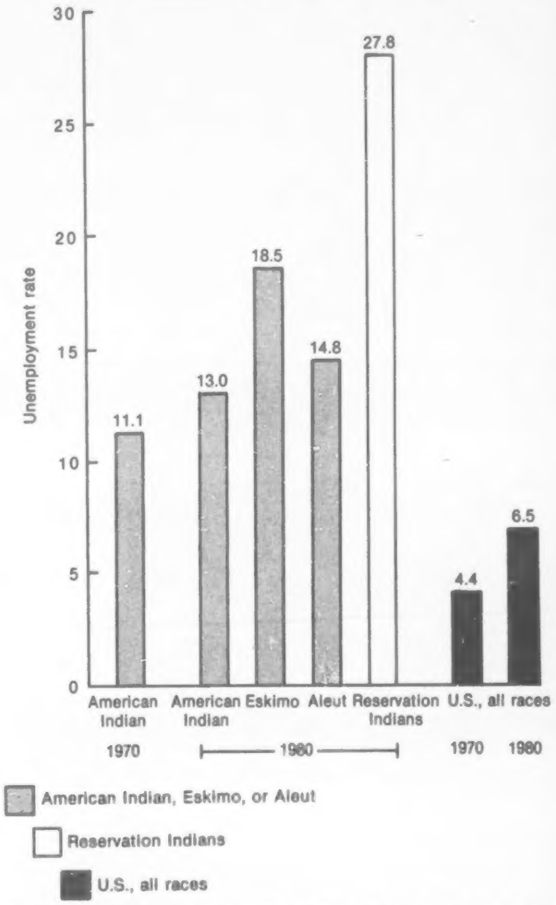
Unemployment rates, another indicator of relative economic well-being, show that unemploy-

Figure 3-11.—Families Maintained by Women, 1970 and 1980 (percent of families)



SOURCE: U.S. Bureau of the Census, PC(2)-1F, 1973; PC80-1-C1, 1983; and PC80-2-1D, part 1, 1985.

Figure 3-12.—Unemployment Rates for American Indians, Eskimos, and Aleuts, 1970 and 1980

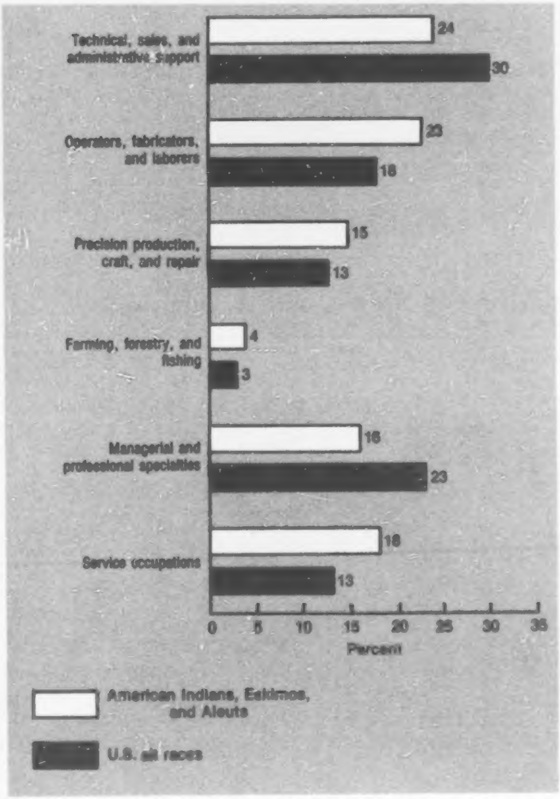


SOURCE: U.S. Bureau of the Census, PC(2)-1F, 1973; PC80-1-C1, 1983; and PC80-2-1D, part 1, 1985.

ment rates for Indians were more than twice the U.S. all races rates of 4.4 and 6.5 percent in 1970 and 1980, respectively (see figure 3-12). In 1980, 13 percent of American Indians, 18.5 percent of Eskimos, and 14.8 percent of Aleuts were unemployed. On reservations, unemployment in 1980 was 27.8 percent of the labor force—more than four times higher than the U.S. all races rate. (Unemployment figures include civilians 16 years old and over who were neither "at work" nor "with a job but not at work," who were looking for work during the last 4 weeks and were available to accept a job, and who were waiting to be called back to a job from which they had been laid off.)

For over 507,000 Indians 16 years old and over who were employed in 1980, jobs held were largely in the technical, sales, and administrative support occupations (24.2 percent), followed closely by jobs as operators, fabricators, and laborers (23 percent), and then by service occupations (18 percent). Three occupational categories with the highest numbers of Indians included food service, cleaning, and building service workers; administrative support occupations, especially secretaries and typists; and professional specialties with highest representation in the job category including teachers, librarians, and counselors. These top three categories included 39.6

Figure 3-13.—Occupation of Employed American Indians, Eskimos, and Aleuts, 1980 (percent of employed persons 16 years and over)



SOURCE: U.S. Bureau of the Census, PC80-1-C1, 1983.

percent of all Indian workers age 16 and over in 1980. The remaining workers were moderately well represented in other occupations (see figure 3-13).

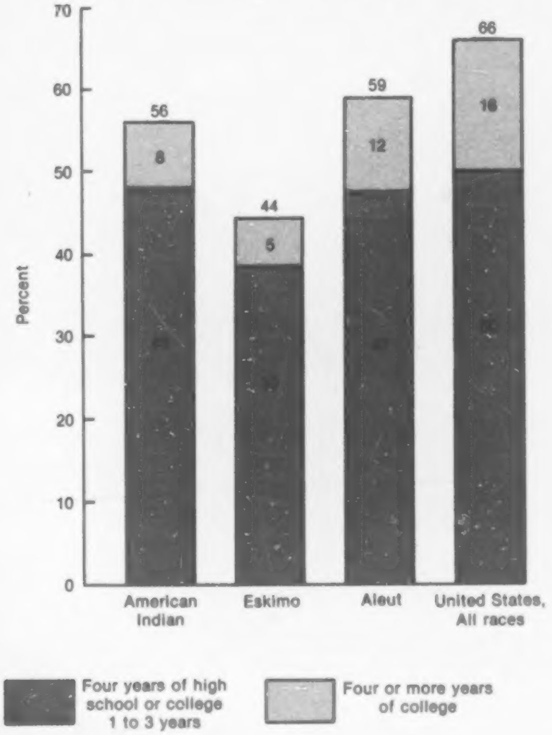
One difference in employment patterns by sex among Indians is that a slightly higher percentage of female workers than male workers held managerial or professional jobs, although in 1980 there were only 854 Indian women out of a total of 5,804 Indian engineers and natural scientists. There were only 150 Indian women and 713 Indian men in health-diagnosing occupations.

Further, a substantially higher percentage of Indian women than men were employed in sales, technical, administrative support, and service occupations. A similar edge was held by Indian men over women in the precision production, craft, repair, machine, fabricating, and labor occupations. These gross comparisons are based on only six major occupational categories that were delineated by the U.S. Bureau of the Census to represent as closely as possible the structure of the American economy in 1980. Clearly, the occupational categories are oversimplified here. It is also important to note that reporting and coding errors have been known to be particularly problematic with individual, self-reported occupations, including those collected by the census.

Many people assume that Federal, State, and local governments (including tribal governments) are the major employers of Indians. This perception is most likely due to the relatively high visibility of Indians employed in the public sector, especially those employed by BIA and IHS. Actually, American Indian, Eskimo, and Aleut workers in 1980 were predominantly employed in private sector jobs. Sixty-six percent of Indian workers 16 years of age and over worked in the private sector, another 5 percent were self-employed, and a marginal number were unpaid family workers. Government workers comprised 29 percent of the total with 11 percent, 6 percent, and 12 percent employed in Federal, State, and local government jobs, respectively.

Educational attainment includes within each category of the highest grade of school completed: 1) the number of persons who reported the indicated grade as the highest grade attended and that they had finished it; 2) those who attended but did not complete the next higher grade; and 3) persons still attending the next higher grade. Largely because of government and tribal scholarship or financial aid programs, American Indians were receiving more education beyond high school between 1970 and 1980. In 1980, 16 percent of the U.S. all races population over 25 years had completed 4 or more years of college; the percentages for Aleuts, Eskimos, and American Indians were 12, 5, and 8 percent, respectively. By comparison, the number of persons completing 4 years of high school and some college were closer across each of these four groups; 50 percent of the U.S. all races population, 47 percent of Aleuts, 39 percent of Eskimos, and 48 percent of American Indians 25 years old and over had

Figure 3-14.—Educational Attainment of Persons 25 Years Old and Over, United States All Races and Indian Population[a]: 1980



[a] The two categories combined (figure at top of each column) represent the percents of the population groups that have, at a minimum, graduated from high school.

SOURCE: U.S. Bureau of the Census, PC80-1-C1, 1983.

high school diplomas or the equivalent plus some college background (see figure 3-14). In 1980, 43.2 percent, or roughly three out of every seven reservation Indians 25 years old and over, were high school graduates.

Median age in 1980 was 23.4 for American Indians, 21.3 for Eskimos, 24.5 for Aleuts, and 19.7 for reservation Indians, compared to 30.0 for the U.S. all races population.

One would expect that educational attainment rates would increase as the Indian population ages, and this might indeed be the overall effect nationally; but recently published data for reservation Indians suggest that educational opportunities are not as widely pursued by reservation Indians as they are among Indians living off reservations. The Bureau of the Census reports that 27.1 percent of reservation Indians 16 to 19 years old were not enrolled in a regular school and were not high school graduates in 1980. These persons, in all likelihood, were drop-outs. If individuals were enrolled in trade or business schools, company training, or were receiving schooling through a tutor, they were counted as being enrolled only if the course credits they would obtain were transferable to a regular elementary school, high school, or college. So this indicator, which includes only "regular schooling," might overstate educational deficiencies slightly. Nevertheless, only 2.6 percent of reservation Indians 20 to 34 years old, an age group spanning 15 years, were enrolled in school.

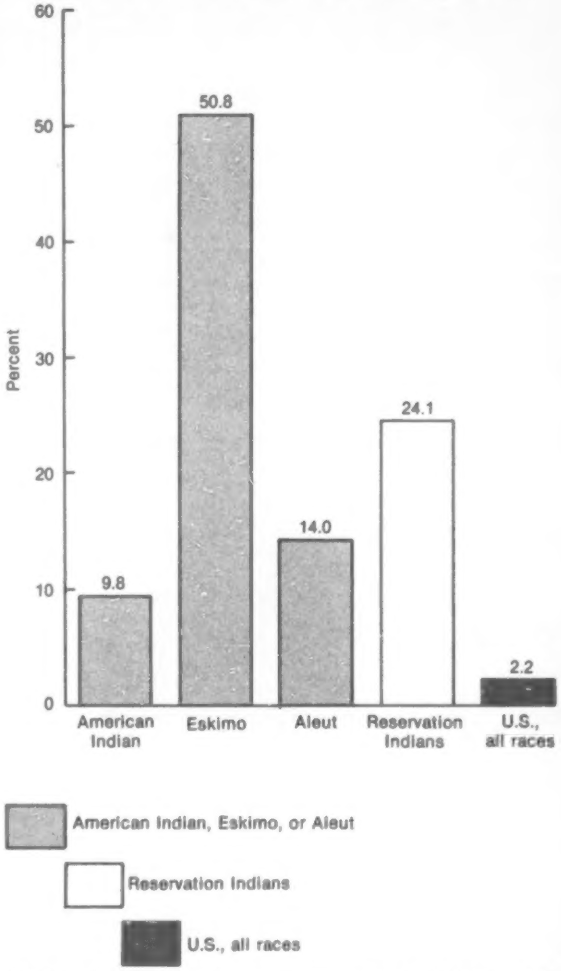
Unpublished findings based on an analysis of the Bureau of the Census' 1980 public-use microsample data set indicate that for certain Indians 25 years and older living on or near a reservation, the probability of completing 4 or more years of postsecondary education was the lowest that it had been for 50 years. In the 25 to 30 and 61 to 65 year age groups, Indian men and women who had finished high school had less than a 10 percent chance of ever completing 4 or more years of college. The highest probabilities of completing postsecondary education and perhaps the best educational opportunities were found among Indian men in three age groups comprising those who were 41 to 55 years of age in 1980. This is probably due to GI bill educational benefits, since the same phenomenon does not exist among Indian women (114).

A recent study of over 9,500 Indian students at the University of New Mexico (UNM) found an alarmingly high propensity for failure to complete postsecondary education programs. An Indian student at UNM completing an undergraduate degree in 4 years and a master's degree in 2 years is a rare exception. Tentative findings show that the median number of years it has taken UNM's Indian students to complete an associate degree is 8 if a student attended UNM on a part-time basis. A small minority of students, around 1 percent of the total included in the study, required a median number of 5 years to complete a bachelor's degree if they undertook 13 or more credit hours per semester (53). While these findings perhaps should not be generalized to all Indian students enrolled in universities, research of this type may aid in explaining why Indian students have greater difficulty completing degree programs than their non-Indian counterparts. Budgets of many Indian scholarship programs, including those of private foundations, have been cut back in recent years, and restrictions on the number of semesters for which support can be extended create financial barriers that many Indian students cannot overcome. While national level data on Indian educational attainment appear positive, closer examination over time by age group, sex, and residence indicate serious deficiencies in educational opportunities for Indians. Interrupted, nontraditional educational careers seem to prevail, and therefore the economic returns resulting from higher education are probably not the same for Indians as those experienced by the general U.S. population.

The lack of complete plumbing facilities for exclusive use was no longer a problem of major proportion in 1980 in the United States as a whole. On the other hand, American Indian, Eskimo, and Aleut housing units on average were about 20 years behind the U.S. all races average in this respect. The last time housing units in the United States had experienced plumbing deficiencies that were roughly equal to the 1980 average for Indian housing units was in 1960. Worse yet, in 1980, more than 50 percent of all Eskimo housing units lacked plumbing for exclusive use—78.9 percent of these households had no plumbing facilities at all (see figure 3-15). Among over 81,000 Indian housing units on reservations, 24.1 percent were without complete plumbing for exclusive use in 1980.

Settlement patterns of Indians in SMSAs show that urban Indians are a highly mobile group. According to the 1980 census, approximately 52 million housing units in the United States were owner-occupied, and 29 million were occupied by renters. In other words, 64 percent of all U.S. housing units were occupied by owners themselves. Each percentage point represents more than half a million (517,964) housing units for the United States as a whole. Of the 60 million U.S. housing units within SMSAs, 37 million were lived in by owners and 23 million by renters.

Figure 3-15.—Percent of Occupied Housing Units Lacking Complete Plumbing Facilities, 1980



SOURCE: U.S. Bureau of the Census, HC80-1-A1, 1983, and PC80-2-1D, part 1, 1985.

Thus, 61 percent of U.S. householders in SMSAs were in owner-occupied housing. In rural areas, an even higher percentage of U.S. housing units, 80 percent, were occupied by owners.

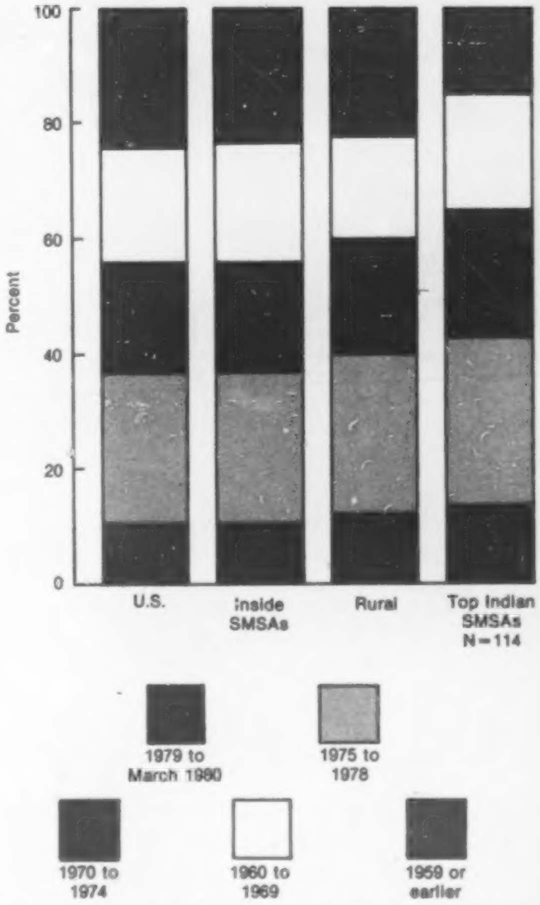
According to the 1980 census, trends in home ownership were similar in rural and urban areas. Fifty-six percent of the 52 million owner-occupied housing units in the United States had been moved into since 1970; 21 percent were established between 1960 and 1969, 12.8 percent between 1950 and 1959, and only 9.7 percent in 1949 or earlier.

In SMSAs, 56 percent of all householders had moved into owner-occupied housing since 1970; 22.1 percent had done so between 1960 and 1969, 13.4 percent between 1950 and 1959, and 8.5 percent in 1949 or earlier. In rural areas, 60 percent had moved into owner-occupied housing units since 1970; 20 percent had done so between 1960 and 1969, 10 percent between 1950 and 1959, and 11 percent in 1949 or earlier.

In 114 SMSAs where the combined American Indian, Eskimo, and Aleut population was greater than or equal to 1,000, the 1980 census identified 99,998 Indian householders in owner-occupied housing units. Sixty-eight percent of these households—the vast majority—had been established since 1970; 19 percent between 1960 and 1969, and 13 percent in 1959 or earlier (contrasted with the U.S. all races average of 22.5 percent) (see figure 3-16). Each percentage point in SMSAs with 1,000 or more Indians, Eskimos, and Aleuts represents 997 housing units with an Indian householder.

Among 117,201 Indian householders in renter-occupied housing units in the same 114 SMSAs, 54 percent (representing 63,501 renter-occupied housing units) had just moved into these units within the 15-month period prior to the census date. Thirty-one percent had moved into their rented units between 1975 and 1978, 8.8 percent between 1970 and 1974, and 6.6 percent in 1969 or earlier (see figure 3-17). For every five Indian renters living in SMSAs, roughly two had moved one or more times within the same metropolitan area, and another two had lived in the same place during the 5 years prior to the 1980 census.

Figure 3-16.—Year Householder Moved Into Owner-Occupied Housing Unit

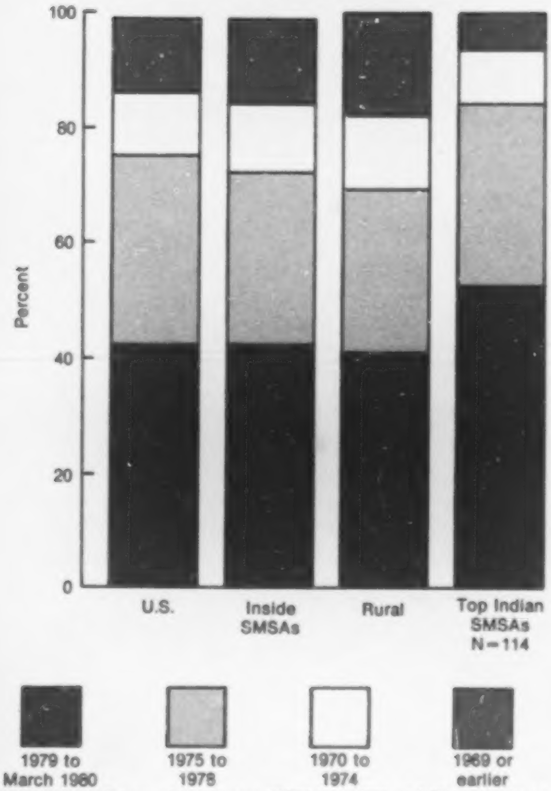


SOURCE: U.S. Bureau of the Census, HC80-1-A1, 1983; and State reports on SMSAs tabulated by OTA.

On an individual level, mobility among urban Indians is pronounced. For persons 5 years and older, the Bureau of the Census ascertained residence in 1975. There were 620,502 Indian persons who were at least 5 years old living in the top 114 SMSAs in 1980. Between 1975 and 1980, 58.8 percent of these individuals had lived in a different house in the United States, 39.6 percent lived in the same house, and 1.6 percent lived abroad. Of the 58.8 percent (or 364,834 individuals) who lived in a different house in the United States, 136,229 had moved in from outside of their current SMSA; of these, 86,753 had lived in a different SMSA, and 49,476 had moved in from nonmetropolitan settings. In 1975, 121,528 or one-third of those living in a different house in the United States lived in the central city of their current SMSA. Thus, of the 620,502 Indian persons 5 years and older living in the top 114 SMSAs in 1980, the overwhelming majority (90.4 percent) had been metropolitan dwellers for at least 5 years; 8 percent were new metropolitan dwellers; and 1.6 percent moved to a metropolitan area after having lived outside of the United States (see table 3-5).

A point that should be made here is that not all Indians living off reservations and other designated areas are urban Indians. According to the Census Bureau, 63 percent of the Indian, Eskimo, and Aleut population in 1980 lived outside identified Indian areas (reservations, tribal trust lands, Alaska Native villages, and historic areas of Oklahoma excluding urbanized areas). Only 54 percent of the Indian, Eskimo, and Aleut population (compared to 74 percent of the U.S. all races population) in 1980, however, lived in metropolitan areas (146). In other words, some nonreservation Indians lived in nonmetropolitan areas. A separate but closely related point is that some reservation Indians are urban Indians. A number of Indian reservations are located in metropolitan areas inside SMSAs because of increasing growth of urban land areas nationally, and roughly 10 percent of IHS's estimated service population for its reservation-oriented direct care system resides in metropolitan areas.

Figure 3-17.—Year Householder Moved Into Renter-Occupied Housing Unit



SOURCE: U.S. Bureau of the Census, HC80-1-A1, 1983; and State reports on SMSAs tabulated by OTA.

Table 3-5.—Settlement Patterns of Indians in 114 SMSAs With 1,000 or More American Indians, Eskimos, and Aleuts

	Number	Percent
Residence in 1975:		
Persons 5 years old and over	620,502	
1. Living in the same house	245,727	39.6%
2. Living in a different house in the U.S.	364,834	58.8
Central city of this SMSA	121,528	
Remainder of this SMSA	107,077	
Outside of this SMSA	136,229	
Different SMSA	86,753	
3. Abroad	9,941	1.6

SOURCE: U.S. Bureau of the Census, State reports on SMSAs tabulated by OTA.

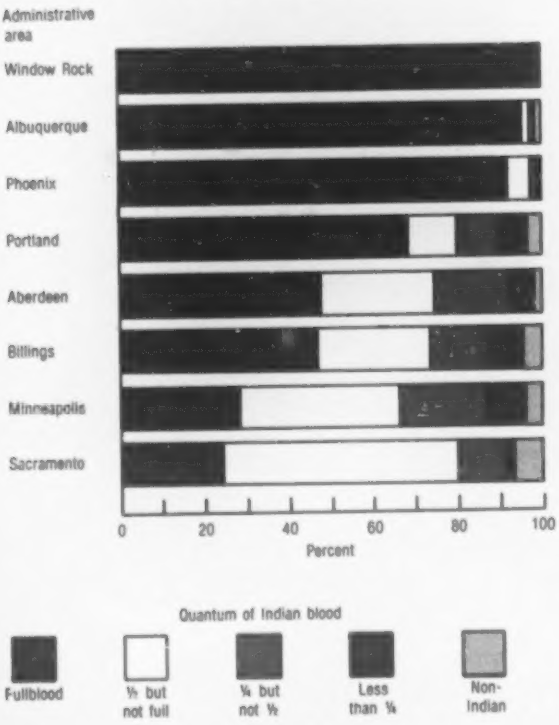
FOUR PROJECTIONS OF THE EFFECT OF INTERMARRIAGE ON THE NUMBER OF INDIAN DESCENDANTS

The U.S. Bureau of the Census reported in 1985 that both American Indian women and men were marrying non-Indians at rates exceeding 50 percent (149). In 1980, 119,448 out of 258,154 married American Indian, Eskimo, and Aleut couples were married within the same racial group; 130,256 Indian individuals were married to either whites, blacks, Filipinos, Japanese, or Chinese; and 8,450 Indians were married to individuals of other races. A married couple in the census is a husband and wife enumerated as members of the same household and includes persons in formal as well as common-law marriages. Fourteen categories of race were used to determine whether husbands and wives were of the same or different race. From 1970 to 1980, the rate of marriage to non-Indians increased by almost 20 percentage points. In 1970, the rate was already quite high: 35.6 percent of married Indian women were married to white husbands, and 33.4 percent of married Indian men were married to white wives (97).

Births resulting from unions of Indians and non-Indians, whether consensual or within marriage, will greatly increase the number of persons claiming to be of Indian descent and will decrease the blood quantum of the "average" Indian in the long run. Especially with respect to health care provided by IHS, the implications of this projected growth for tribes in determining who is an Indian and for services provided on the basis of Indian descendancy, are that growth must be accommodated by increasing services or by eventually restricting services to fewer individuals.

Figure 3-18 shows an estimated distribution of reservation residents by Indian blood quantum for 1950. This information, which had been collected in part to provide justification for the termination and assimilation policies of the 1950s, is no longer available from BIA but may be available on an individual tribal basis. BIA headquarters has no interest in maintaining such records, because a one-fourth blood Indian is treated the same as a *full-blooded Indian for eligibility purposes*, and certification for services takes place at the agency (field) level (15).

Figure 3-18.—Distribution of Reservation Residents, by Quantum of Indian Blood for Selected Bureau of Indian Affairs Administrative Areas,[a] United States, 1950



[a] Those for which data on blood quantum were reported.

SOURCE: U.S. Department of Health, Education, and Welfare, Surgeon General of the Public Health Service, *Health Services for the American Indian* (Washington, DC: U.S. Department of Health, Education, and Welfare, Feb. 11, 1957), p. 14.

A special version of an age-cohort, demographic projection model specifying populations for each of nine different blood quantum groupings was developed under an OTA contract. The model was applied under four sets of assumptions to estimate the distribution of Indians by blood quantum in the 32 reservation States for various years up to 100 years into the future (221).

Indians were tracked according to blood quantum in order to estimate the composition of the IHS service population for these years. The basic assumptions were that fertility rates, mortality rates, and survival rates would remain constant from the base year of the projection, 1980, and that they are the same for all nine blood quantum groupings. The model permits one to change any of the basic assumptions. Such a change could be, for example, to assume that Indian mortality rates would reach the current level of the U.S. all races population by the year 2000. Throughout all four scenarios, the fertility, mortality, and survival rates are assumed to be the same.

To show the range of future possibilities in the composition of the Indian population, OTA created four different scenarios, varying the outmarriage rates and distribution of the base population into blood quantum groups. In Scenario I, all Indians are assumed to be full-blooded in the base year, and all unions are presumed to be with other Indians; hence, all offspring would also be full-blooded Indians. In Scenario II, the assumption again is that in the base year all Indians are full-blooded, but the 53 percent outmarriage rate reported by the Bureau of the Census is used to assign probabilities that births resulting from Indian/non-Indian unions will fall into specific blood quantum groups. The use of "marriage rate" and "outmarriage rate" is meant to represent "unions-potential for births," not actual marriages. Marriage and outmarriage "rates" are used to determine potential populations of females to which the fertility rates will be applied to calculate births. In Scenario III, an approximation of the 1950 blood quantum information is used; i.e., that 60.2 percent of all Indians are full-blooded, 26.7 percent are half, 9.5 percent are one-fourth and 3.6 percent are less than one-fourth. These figures have been adjusted by including an approximated blood quantum distribution for Oklahoma area Indians. The Oklahoma area, which comprised 21 percent of the BIA population in 1950, was assumed to have a blood quantum distribution equal to that of Indians in the Sacramento area. A constant outmarriage rate of 53 percent was applied across all blood quantum groups. Scenario IV is almost identical to Scenario III, except that the rate at which births result from Indian and non-Indian unions is lowered to 40 percent. The rate has been adjusted downward to take into consideration births resulting from Indian unions occurring consensually that may not be reflected in the census data on marriage. The information generated by the latter three projections are used to examine variations in the future size of the Indian population at certain blood quantum thresholds.

All of the data for OTA's population projections were made available by the IHS Program Statistics Branch and the U.S. Bureau of the Census. Insofar as the projection model yields results in actual numbers, OTA advises that they be used cautiously. The data on which OTA's projections are based are presented below along with a description of the four scenarios outlined above. Results for 1985 and each 20-year period after the base year through 2080 are printed in a summary table at the end of this section. Twenty-year periods are used to approximate one generation, though in many areas, a generation in the Indian population may be less than 20 years.

Table 3-6.—American Indian and Alaska Native Population for 32 Reservation States, by 5-Year Age Group and Sex, 1980 Census Data

Age	Total	Male	Female
<5	139,529	70,783	68,746
5 to 9	136,361	68,859	67,502
10 to 14	144,882	73,496	71,386
15 to 19	156,749	79,005	77,744
20 to 24	134,769	67,184	67,585
25 to 29	112,519	55,193	57,326
30 to 34	95,949	46,810	49,139
35 to 39	75,169	36,591	38,578
40 to 44	61,983	30,009	31,974
45 to 49	52,134	24,986	27,148
50 to 54	46,307	22,308	23,999
55 to 59	40,313	19,170	21,143
60 to 64	30,711	14,463	16,248
65 to 69	25,817	11,748	14,069
70 to 74	18,076	8,062	10,014
75 to 79	12,476	5,587	6,889
80 to 84	6,367	2,619	3,748
>85	5,339	2,126	3,213
Total	1,295,450	638,999	656,451

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Population Statistics Staff, September 1985; (0062K)/p. 15.

Table 3-7.—Age-Specific Fertility Rates for American Indians and Alaska Natives by Age of Mother, Reservation States, 1980-82

Age of mother	Live births	Female population	Age-specific fertility rate
15 to 19	23,746	231,195	0.5135
20 to 24	39,764	199,239	0.9980
25 to 29	25,672	168,981	0.7595
30 to 34	12,170	144,327	0.4215
35 to 39	4,062	113,089	0.1795
40 to 44	834	93,873	0.0445
45 to 49	41	79,705	0.0025

SOURCE: U.S. Department of Health and Human Services, Public Health Service Service, Health Resources and Services Administration, Indian Health Service, Vital Events Staff, Apr. 2, 1985 (262K).

The distribution of the Indian population in the 32 reservation States by age and sex is shown in table 3-6. (Note that the population in table 3-6, 1.3 million, is for 32 States, compared to 1.4 million in all 50 States.) Given the age-specific distribution of fertility shown in table 3-7, one is able to calculate that the total fertility rate is 2.92 (i.e., the number of live births per woman of childbearing age were she to progressively follow throughout her life the birth pattern of each age group). Births to women in age groups less than 15 years old are not included; there were 413 live births to Indian women under 15 living in reservation States from 1980 to 1982. Survival rates for males and females are computed as the proportion of individuals in each age group at one point in time who survive into the next age group and time period. Survival rates for the Indian population are included in table 3-8. Information to calculate survival rates is available in "life tables" computed from vital statistics. For example, the Indian male survival rate in the 15 to 19 age group equals 97,518 divided by 97,792 or 0.99, which indicates that 99 percent of the males aged 10 to 14 can be expected to survive to the next age group, 15 to 19. (Numerical results by selected

Table 3-8.—Number of American Indians and Alaska Natives in 28 Reservation States, Living at Beginning of Age Interval of 100,000 Born Alive, 1979-81

Age group	Males	Females
<5	98,478	98,705
5 to 9	98,037	98,326
10 to 14	97,792	98,159
15 to 19	97,518	98,022
20 to 24	96,274	97,605
25 to 29	94,152	96,966
30 to 34	92,053	96,170
35 to 39	90,061	95,227
40 to 44	87,597	94,050
45 to 49	84,519	92,345
50 to 54	80,971	90,245
55 to 59	76,614	87,473
60 to 64	70,853	84,355
65 to 69	63,546	79,599
70 to 74	54,922	73,043
75 to 79	45,531	65,525
80 to 84	35,924	57,266
>85	26,748	45,589

SOURCE: U.S. Department of Health and Human Services, Public Health Service Service, Health Resources and Services Administration, Indian Health Service, Indian Health Service, Vital Events Staff, "American Indian and Alaska Native Life Expectancy, 1979-1981," June 1984.

age group, sex, and total population are presented later in table 3-9 for all four projections.)

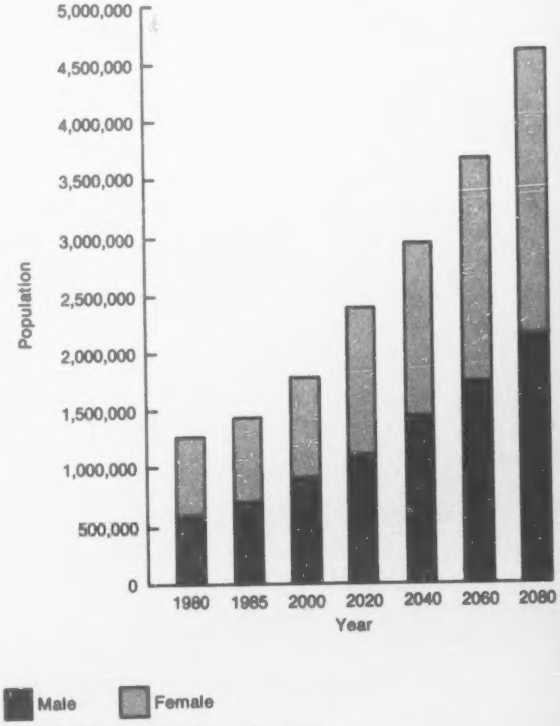
Scenario I

As a lower bound, assuming a 100 percent blood quantum (all Indians are full-blooded) in the base year and presuming that all births result from unions of Indians with Indians, the 1980 Indian population of 1.3 million doubles in about 45 years and grows to roughly 4.6 million Indians in 2080. The unrealistic aspects of this scenario are that all Indians in 1980 were not full-blooded, and the effect of out-unions is not captured. Subsequent scenarios use assumptions that come progressively closer to representing existing factors likely to influence Indian population growth. One factor is the rate of births resulting from the pairing of Indians and non-Indians which, when they have children, have considerable potential to increase the number of Indian descendants. Another factor that we try to account for is the dilution of Indian blood quantum on average that naturally occurs with intermarriage. Recall that the use of "marriage rate" and "outmarriage rate" or "out-union" rate is meant to represent "unions-potential for births," not actual marriages. These "rates" are used to determine potential populations of females to which the fertility rates will be applied to calculate births (see figure 3-19).

Scenario II

We assume again that all Indians are full-blooded in the base year but use an outmarriage rate of 53 percent as reported by the Bureau of the Census for 1980 to assign offspring to one of nine blood quantum groups. For example, the child of two full-blooded Indians remains in the same blood quantum group as his or her parents; the child born of a mother who is one-quarter Indian and a father who is one-half is assigned to the three-eighths group. Assignment of offspring to specific blood quantum groups works correspondingly for succeeding generations. Under the assumptions of Scenario II, doubling occurs more quickly than in Scenario I, in roughly two generations, shortly after the year 2000. Over the

Figure 3-19.—OTA Population Projection Scenaro I: No Outmarriage



SOURCE: Office of Technology Assessment.

Table 3-9.—Age-Focused Population Projection Summary All Indians and Indian Descendants, Selected Years, 1980-2080

	Projection year						
	1980	1985	2000	2020	2040	2060	2080
Scenario I:							
Females:							
<5	68,746	88,219	96,872	128,134	156,038	192,632	242,153
15 to 49	349,494	386,945	471,487	573,843	729,875	913,817	1,134,337
>60	54,181	63,248	90,591	162,259	216,461	275,675	344,537
Total females	656,451	722,136	927,549	1,213,497	1,527,602	1,901,854	2,375,910
Males:							
<5	70,783	91,819	100,826	133,364	162,407	200,495	252,037
15 to 49	339,778	376,180	459,897	570,454	726,685	909,324	1,129,211
>60	44,605	48,332	58,589	98,319	127,190	168,897	210,712
Total males	638,999	697,196	880,879	1,139,494	1,429,027	1,785,740	2,230,092
Both sexes:							
<5	139,529	180,038	197,698	261,498	318,445	393,127	494,190
15 to 49	689,272	763,125	931,384	1,144,297	1,456,560	1,823,141	2,263,548
>60	98,786	111,580	149,180	260,578	343,651	444,572	555,249
Total both sexes	1,295,450	1,419,332	1,808,428	2,352,991	2,956,629	3,687,594	4,606,002
Scenario II:							
Females:							
<5	68,746	134,975	148,214	294,353	494,497	812,098	1,325,201
15 to 49	349,494	386,945	516,788	831,448	1,462,830	2,522,578	4,259,294
>60	54,181	63,248	90,591	162,259	216,461	398,248	689,583
Total females	656,451	768,892	1,126,293	1,890,643	3,158,066	5,358,944	9,054,242
Males:							
<5	70,783	140,484	154,263	306,367	514,680	845,245	1,379,293
15 to 49	339,778	376,180	506,762	832,157	1,466,109	2,524,929	4,264,264
>60	44,605	48,332	58,589	98,319	127,190	249,578	435,220
Total males	638,999	745,861	1,087,193	1,837,183	3,085,888	5,247,613	8,861,834
Both sexes:							
<5	139,529	275,459	302,477	600,720	1,009,177	1,657,343	2,704,494
15 to 49	689,272	763,125	1,023,550	1,663,605	2,928,939	5,047,507	8,523,558
>60	98,786	111,580	149,180	260,578	343,651	647,826	1,124,803
Total both sexes	1,295,450	1,514,753	2,213,466	3,727,826	6,243,954	10,606,557	17,916,076
Percent one-half or more	100.0	100.0	100.0	81.2	56.9	32.9	15.7
Percent one-fourth or more	100.0	100.0	100.0	100.0	92.3	75.7	55.2
Scenario III:							
Females:							
<5	68,746	134,973	148,216	287,217	464,419	715,609	1,076,408
15 to 49	349,494	386,946	516,790	830,222	1,437,144	2,404,500	3,847,954
>60	54,181	63,330	90,637	162,259	216,461	398,251	677,794
Total females	656,451	768,974	1,126,342	1,872,653	3,068,394	5,025,108	7,991,378
Males:							
<5	70,783	140,485	154,264	298,941	483,374	744,817	1,120,344
15 to 49	339,778	376,181	506,764	830,887	1,439,816	2,405,154	3,847,892
>60	44,605	48,333	58,588	98,318	127,192	249,579	427,029
Total males	638,999	745,860	1,087,175	1,818,491	2,993,081	4,904,347	7,775,828
Both sexes:							
<5	139,529	275,458	302,479	586,157	947,793	1,460,425	2,196,753
15 to 49	689,272	763,126	1,023,552	1,661,114	2,876,962	4,809,655	7,695,846
>60	98,786	111,659	148,227	260,577	343,653	647,827	1,104,823
Total both sexes	1,295,450	1,514,834	2,213,517	3,691,144	6,061,475	9,929,455	15,767,206
Percent one-half or more	86.9	83.8	77.8	57.4	36.1	18.8	8.2
Percent one-fourth or more	96.4	95.3	93.4	87.4	76.0	58.8	41.1

Table 3-9.—Age-Focused Population Projection Summary All Indians and Indian Descendants, Selected Years, 1980-2080—Continued

	Projection year						
	1980	1985	2000	2020	2040	2060	2080
Scenario IV:							
Females:							
<5	68,746	123,506	135,621	242,350	370,028	550,613	822,205
15 to 49	349,494	386,947	505,678	766,331	1,242,909	1,961,008	3,001,000
>60	54,181	63,329	90,637	162,259	216,463	368,184	586,391
Total females	656,451	757,506	1,077,594	1,696,233	2,628,134	4,083,941	6,260,685
Males:							
<5	70,783	128,546	141,555	252,242	385,130	573,088	855,765
15 to 49	339,778	376,180	495,269	765,970	1,243,648	1,959,546	2,998,853
>60	44,605	48,332	58,589	98,318	127,191	229,788	367,260
Total males	638,999	733,923	1,036,574	1,636,630	2,544,988	3,960,277	6,060,519
Both sexes:							
<5	139,529	252,054	276,777	494,593	755,158	1,123,701	1,677,920
15 to 49	689,272	763,126	1,000,947	1,532,303	2,486,556	3,920,556	5,999,857
>60	98,786	111,661	149,227	260,577	343,653	597,974	953,651
Total both sexes	1,295,450	1,491,429	2,114,168	3,332,863	5,173,122	8,044,218	12,321,204
Percent one-half or more	86.9	84.6	80.1	64.7	46.6	29.1	15.6
Percent one-fourth or more	96.4	95.7	94.2	90.5	83.2	71.5	57.6

SOURCE: Office of Technology Assessment.

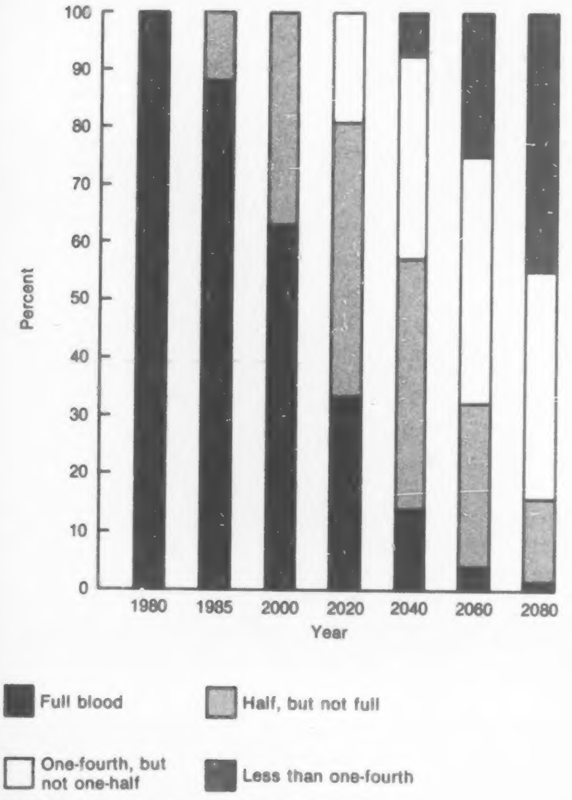
next several generations, the one-fourth and less than one-fourth blood groups increase in numbers, becoming the majority of the Indian population in the generation between 2040 and 2060. In 2060, 4.1 percent of Indians are projected to be full-blooded; the blood quantum of 33 percent would be one-half or more. Then by 2080, less than 1 percent of the projected Indian population of 17.9 million would be comprised of surviving full-blooded Indians compared with a majority of descendants whose Indian blood quantum is significantly diminished. In this scenario, the Indian blood quantum of only 16 percent of the total Indian population in 2080 would be one-half or more. Fifty-five percent would be at least one-fourth, and 45 percent of the total would be less than one-fourth (see figure 3-20).

Scenario III

The third scenario assumes a distribution of Indians in the 1980 base year into blood groups reflecting the findings of the 1950 BIA data with an approximated value for Oklahoma. The total Indian population of all age groups are distributed such that 60.2 percent are assumed to be full-blooded, 26.7 percent are one-half, 9.5 percent are one-fourth, and 3.6 percent are less than one-fourth. For each blood group the outmarriage rates to non-Indians is the same as in Scenario II; we have assumed that the marriage rates, or rather "union" rates which produce children, between Indians in different blood groups are determined by the proportions of Indians of marriageable age in each group.

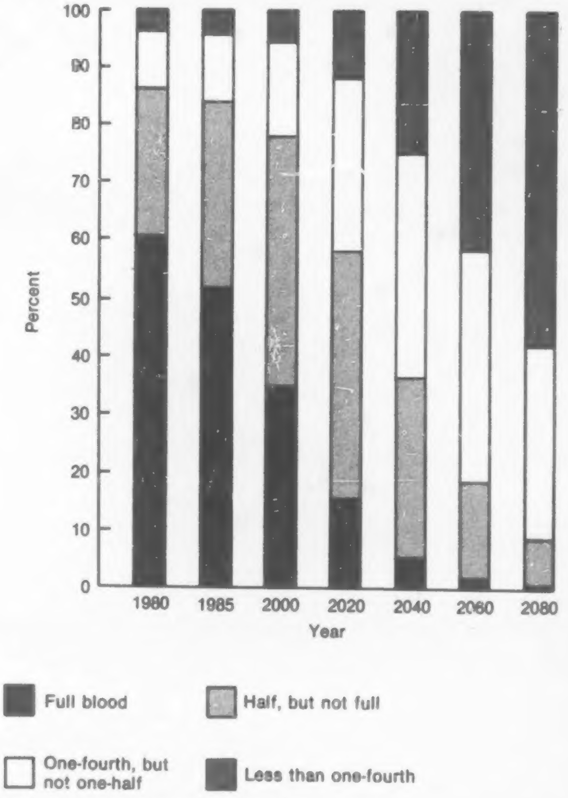
For about two generations, population growth across the four blood quantum groups remains somewhat constant except that in the category of full-blooded Indians, the contribution of inmarriage and reproduction rates is not high enough to keep up with the number being born in lower blood quantum categories. The number of full-blooded Indians declines from 60.2 percent in the base year to 34 percent in 2000, 16 percent in 2020, 6 percent in 2040, to just under 1.5 percent in 2060, and decreases to three-tenths of 1 percent in 2080. The proportion of persons who are at least one-half Indian grows from 1980 for about three generations and then begins dropping off by the fourth generation. Growth in the lower blood quantum groups increases at a fairly steady rate from the base year and grows quite rapidly three generations into the future. Having started out in 1980 with 13.1 percent of the Indian population being one-fourth or less Indian, by 2040, the Indian blood quantum of the majority of the Indian population, 53 percent, would be one-fourth or less, a transition taking approximately 60 years

Figure 3-20.—OTA Population Projection Distribution of Indian Population by Blood Quantum Scenario II: Outmarriage = 53%, Both Sexes



SOURCE: Office of Technology Assessment.

Figure 3-21.—OTA Population Projection Distribution of Indian Population by Blood Quantum Scenario III: Outmarriage-53%, Base Population Mix, Both Sexes



SOURCE: Office of Technology Assessment.

from the base year. At that point, surviving individuals born into either the full- or one-half blood quantum group between 1980 and 1985 would be between 60 and 65 years old, well beyond the end of their childbearing years (see figure 3-21).

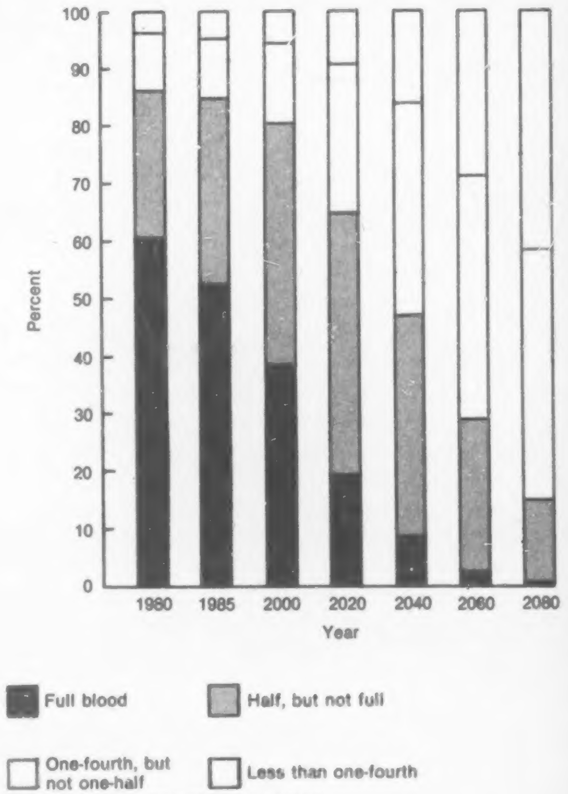
In terms of the total Indian population, including persons in all nine blood quantum groups, a base population of 1.3 million individuals in 1980 is projected to grow by 71 percent in 20 years and to double by the year 2005 under the assumptions of Scenario III. The much larger population of 2020, some 3.7 million persons, is projected to have grown 67 percent in the 20 years since 2000. Another generation later, the number of Indians is projected to increase 64.2 percent to just over 6 million. Under the assumptions of Scenario III, the Indian population is projected to be 4.7 times higher in 2040 than in the base year. By 2060, the Indian population is projected to grow to 9.9 million and reaches 15.8 million by 2080, more than a twelvefold increase from the base year.

Scenario IV

This scenario attempts to account for births that occur to Indians out of wedlock that might not have been reflected in the census data on marriage. For example, reports from the States of New Mexico and South Dakota show births to unmarried Indian women to be 47 and 62 percent, respectively, of all Indian births in those States (115,116). The proportion of these births that are from Indian versus non-Indian fathers is not known. In South Dakota, birth data are based on the race of the mother, and no attempt is made to determine the race of the child based on the father's race. Likewise, in New Mexico birth certificates of infants born to single mothers by law contain no information about the father without acknowledgment of paternity. Therefore, data from which an estimate could be drawn of the numbers of children born out of wedlock to Indian and non-Indian fathers are not available.

The only assumption changed in Scenario IV from the assumptions of Scenario III is the outmarriage rate, which is lowered to 40 percent. Again, the base population in 1980 is distributed by Indian blood quantum with 60.2 percent of all males and females assumed to be full-blooded, 26.7 percent are one-half, 9.5 percent are one-fourth, and 3.6 percent are less than one-fourth. By 1985, given a 40 percent rate of unions between Indians of all blood quantum groups and non-Indians, the difference in the distribution of the population as compared with Scenario III is minor, and the total Indian population is projected to be only 1.5 percent lower. For approximately three generations, the percentage of individuals in the full and one-half blood quantum groups are slightly higher in Scenario IV compared with Scenario III. By the end of the next two 20-year periods, 2060 and 2080, the percentages of individuals in the full- and one-half blood quantum groups are about twice as high as in Scenario III. This indicates that over time, a lower outmarriage rate has a considerable positive effect on the number of Indians with higher degrees of Indian blood. At the 2060 turning point, under Scenario IV there are close to 2.3 million persons in the two lowest blood quantum groups, whereas Scenario III includes roughly 4.1 million persons in the same two groups. The total Indian population in 2060 is projected to be 8 million under Scenario IV and 9.9 million under Scenario III. Under Scenario IV, by 2080 the total number of Indians is projected to have grown to 12.3 million, with 58 percent being of one-fourth or more Indian blood quantum (see figure 3-22). Scenarios III and IV demonstrate sensitivity to the size of the outmarriage rate. There would be more individuals in higher Indian blood quantum groups given lower rates of outmarriage.

Figure 3-22.—OTA Population Projection Distribution of Indian Population by Blood Quantum Scenario IV: Outmarriage-40%, Base Population Mix, Both Sexes



SOURCE: Office of Technology Assessment.

As shown in table 3-9, the numerical differences between Scenarios III and IV are relatively minor for the first two generations following the base year. The projected population under Scenario III is 15 percent higher in 2040, 19 percent higher in 2060, and 22 percent higher in 2080. Under the assumptions of Scenario IV, the Indian population is projected to grow by a factor of 9.5 from the base year to 12.3 million in 100 years.

Summary and Conclusions

A summary of the four population projections appears in table 3-9, which is organized by selected age groups (less than 5 years; 15 to 49; 60 years and over), sex, and total population for each of the projection years, and includes the percentages of the total Indian population that are one-half or more and one-fourth or more Indian blood. What is most evident in table 3-9 and the preceding presentation of Scenarios I through IV is that even between 1980 and 2000, the projected population growth is quite large, ranging from 40 to 71 percent. The projections of Indian population that are farthest into the future are so large numerically that they should be interpreted with caution.

An important point that should be kept in mind when referring to these population projections is that several of the scenarios use assumed distributions of blood quantum in the base year. The use of blood quantum by Indian tribes as one of the bases for determining tribal membership and use of blood quantum to determine eligibility for Federal services are ridden with controversy. Many tribal members are emphatically against the Federal Government's use of a blood quantum standard; and the opposing Government view is that if tribes use blood quantum, then it should be acceptable for the Federal Government to use it in determining eligibility. Indians are the only group of people in this country who use blood quantum to define their members.

The potential effects of imposing a blood quantum eligibility rule on current users of IHS services are serious. There will be many individual situations in which a nationally applied definition of "Indian" for eligibility purposes will mean absolute termination of health care benefits. A complicated situation, illustrated by OTA's population projections, is that there is a growing number of Indian descendants of mixed Indian parentage who may not have enough Indian blood of any particular tribe to qualify for membership. IHS's proposed rule to extend eligibility to nontribal members who are at least one-half Indian is a partial solution.

One can easily think of individual situations where descendants would be unable to meet a stricter eligibility standard while still maintaining strong tribal affiliations. Moreover, eligibility for services to individuals would have to be cut off summarily at some point. Hypothetically, under the proposed rule, a baby born in an IHS facility and requiring expensive intensive care, who was three-eighths Indian and not eligible for membership in his or her tribe, could be liable for the cost of his or her care. Situations such as these could occur on a potentially large scale. Provisions would have to be made to ensure that individuals caught in transition from relatively broad to comparatively strict eligibility rules would not be denied treatment if an eligibility standard based on blood quantum were to be implemented.

Chapter 4

Health Status of American Indians

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Chapter 4

Health Status of American Indians

INTRODUCTION

Information on the health status of American Indians is presented in this chapter. The focus is on health problems of Indians in areas served by the Indian Health Service (IHS), and not on Indians in urban or other nonservice areas. The health status of all Indians in IHS areas is presented, followed by analyses of health conditions in each of the 12 IHS service areas. Mortality rates are the primary source of health status information, but patient care data from IHS and other sources are also used to provide information on morbidity (illness) and access to health services.

Sources and Limitations of Data

Sources

Except where otherwise indicated, the data used in this chapter were obtained from IHS, the National Center for Health Statistics (NCHS), and the U.S. Bureau of the Census.

Population Data.—As discussed in chapter 3, the Indian Health Service obtains Indian population statistics from the U.S. Census, which is conducted every 10 years. Using these data, IHS projects its estimated Indian population for the coming decade. Then, every year between censuses, IHS reestimates the Indian population by using Indian birth and death data obtained annually from the National Center for Health Statistics. IHS provided OTA with population estimates using NCHS birth and death data through calendar year 1982; these population estimates were used to calculate mortality (death) and health care utilization rates.

Mortality (Death) and Morbidity (Illness and Injury) Data.—A computer tape with information about Indian deaths during the period 1980-82 was provided by IHS to OTA; OTA's analysis of this information is explained in appendix D.

Information concerning morbidity (illness and injury) was derived from two IHS data sources: 1) the Inpatient Care System (IPC), which contains IHS direct care and contract care general hospital discharge data; and 2) the Ambulatory Patient Care System (APC), which contains information on the number of outpatient visits at IHS facilities by various patient characteristics (age, sex, diagnosis, community of residence, etc.). IHS provided OTA with computer tapes pertaining to its IPC and APC systems; its internal documents and outpatient care on hospital utilization by area (166,176); and printouts of the 15 leading diagnoses for outpatient visits by reservation State, county, IHS area, and IHS service unit.

Limitations

These data sets and resulting analyses have several limitations that affect the validity of the information on Indian health status presented in this chapter.

Population Estimates.—While the data collected by the U.S. Bureau of the Census and NCHS have limitations generally (e.g., see ch. 3 for limitations of the census data), data concerning Indians are believed to be particularly problematic, especially in areas of the country where Indians have integrated into other populations. In addition, there are limitations to IHS's calculation of its service population. The service population is determined by counting those American Indians, Eskimos, and Aleuts (as identified in the census) who reside in the geographic areas, defined by county, in which IHS has responsibilities ("on or near" reservations and in contract health service delivery areas [CHSDAs]). Figure 1-7 in chapter 1 shows the location of IHS facilities; in general, the eligible population is estimated from census counts of Indians residing in counties surrounding these facilities. IHS estimates that about 60 percent of the Indian population was eligible for services in 1984 (see tables 4-1 and 4-2), but the people IHS counts as eligible may or may not use IHS services or even be eligible for such services. Thus, IHS does not have a firm idea

Table 4-1.—Estimated Total U.S. Indian Population and IHS Service and Nonservice Population, by State 1980

		Reservation States			
State	Estimated total Indian population 1980 Census data	Total Indian population	IHS service population	Nonservice population	Nonreservation State
Alabama	7,724	7,724	2,696	5,028	
Alaska	71,329	71,329	71,329		
Arizona	169,869	169,869	169,869		
Arkansas	9,937				9,937
California	216,070	216,070	73,262	142,808	
Colorado	20,206	20,206	2,989	17,217	
Connecticut	4,728	4,728	830	3,898	
Delaware	1,377				1,377
District of Columbia	1,034				1,034
Florida	20,095	20,095	5,956	14,139	
Georgia	7,922				7,922
Hawaii	4,000				4,000
Idaho	11,453	11,453	7,598	3,855	
Illinois	17,657				17,657
Indiana	8,315				8,315
Iowa	6,083	6,083	2,052	4,031	
Kansas	16,688	16,688	3,261	13,427	
Kentucky	3,790				3,790
Louisiana	13,095	13,095	1,164	11,931	
Maine	4,515	4,515	3,004	1,511	
Maryland	8,556				8,556
Massachusetts	8,428				8,428
Michigan	42,453	42,453	8,944	33,509	
Minnesota	39,402	39,402	19,074	20,328	
Mississippi	6,729	6,729	4,563	2,166	
Missouri	12,948				12,948
Montana	41,695	41,695	34,639	7,056	
Nebraska	10,340	10,340	4,347	5,993	
Nevada	14,674	14,674	14,674		
New Hampshire	1,432				1,432
New Jersey	9,165				9,165
New Mexico	116,150	116,150	113,569	2,581	
New York	40,876	40,876	10,266	30,610	
North Carolina	69,575	69,575	6,045	63,530	
North Dakota	22,976	22,976	18,554	4,422	
Ohio	13,513				13,513
Oklahoma	186,268	186,268	186,268		
Oregon	29,609	29,609	28,039	1,570	
Pennsylvania	10,040	10,040	72	9,968	
Rhode Island	3,170	3,170	1,226	1,944	
South Carolina	6,089				6,089
South Dakota	50,139	50,139	45,854	4,285	
Tennessee	5,372				5,372
Texas	41,970	41,970	763	41,207	
Utah	21,468	21,468	10,229	11,239	
Vermont	1,015				1,015
Virginia	9,760				9,760
Washington	66,423	66,423	61,217	5,206	
West Virginia	1,642				1,642
Wisconsin	32,148	32,148	18,982	13,166	
Wyoming	8,256	8,256	5,467	2,789	
All States	1,548,168	1,416,216	936,802	479,414	131,952

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, Population Statistics Staff, internal document, Rockville, MD, Feb. 20, 1985.

Table 4-2.—Estimated Indian and Alaska Service Population by Area, 1980-90[a]

Area	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Aberdeen	63,253	64,990	66,805	68,688	70,648	72,679	74,781	76,961	79,220	81,541	83,944
Alaska	64,047	65,743	67,521	69,383	71,329	73,351	75,461	77,647	79,917	82,267	84,702
Albuquerque	46,610	47,695	48,825	49,907	51,211	52,471	53,771	55,117	56,506	57,936	59,412
Bemidji	42,686	43,664	44,711	45,821	47,000	48,245	49,550	50,929	52,363	53,881	55,453
Billings	35,708	36,735	37,813	38,935	40,106	41,326	42,594	43,906	45,272	46,682	48,142
California	65,757	67,048	68,460	69,989	71,642	73,414	75,306	77,309	79,439	81,687	84,048
Nashville	26,731	27,181	28,136	30,644	35,822	36,413	37,025	37,663	38,332	39,021	39,736
Navajo	145,162	149,208	153,380	157,627	162,005	166,493	171,097	175,809	180,635	185,571	190,621
Oklahoma City	172,636	176,527	180,664	185,811	190,451	195,346	200,488	205,871	211,510	217,402	223,536
Phoenix	74,020	76,309	78,206	80,203	82,309	84,516	86,826	89,244	91,755	94,373	97,104
Portland	75,769	77,365	79,086	87,861	96,427	98,996	101,275	103,637	106,082	108,610	111,211
Tucson	16,230	16,590	16,980	17,400	17,852	18,332	18,843	19,386	19,958	20,561	21,194
All areas	828,609	849,075	870,567	902,399	936,802	961,582	987,017	1,013,479	1,040,989	1,069,537	1,099,103

[a]Estimates were based on data on U.S. Census counts for 1980 and Indian births and deaths through calendar year 1982. Prior and subsequent estimates for 1980-1990 are based on Indian birth and death data as available to IHS from NCHS.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, Population Statistics Staff, internal document, Rockville, MD, Feb. 1, 1985.

of how many Indians are in its potential service population.

These limitations affect conclusions about health status, because the estimate of the service population is used as the denominator in calculating mortality and morbidity rates. If a population is undercounted while deaths in that population are counted accurately, the health of the population will appear to be worse than it actually is. Conversely, if the population is counted accurately, but the number of deaths is undercounted, the health of the population will appear to be better than it really is. The latter situation applies to information on Indians in California, where IHS estimates that the eligible service population was approximately 73,000 in 1984. However, NCHS data contained information on only 471 Indian deaths in that population in those 3 years, resulting in a mortality rate of less than 300 per 100,000 population, a rate lower than that of the wealthiest communities in the United States.

Other limitations of the population estimates provided by IHS occurs because of the way IHS calculates the age and sex characteristics of its service populations. These are based on census counts for reservation States, not the counties within the States covered by IHS service areas (193). These may or may not differ. The effect, however, is that age and sex distributions for entire reservation States are used to calculate age- and sex-specific mortality and morbidity rates for service areas, introducing unknown error.

In addition, IHS does not currently adjust for changes in the age and sex distribution of its intercensus estimates (191). Rather, age and sex distributions from the most recent census are applied to population estimates for intercensus years. If the estimated age and sex distribution in a particular area changed significantly in the years after the census, health indicator rates for that area that were supposedly age-adjusted or sex-specific would not be accurate. However, OTA's analysis is based on data from 1980 to 1982, so the errors introduced by using the 1980 census age and sex distributions are minimal. (At the time this report was being published, IHS was considering revising its population forecasting techniques to provide more precise age and sex distribution estimates.)

Depending on the extent of discrepancies between population counts and estimates, IHS may also recalculate estimates for previous decades. The IHS service population enumerated in 1980 was approximately 13 percent higher than that estimated by IHS for 1979, which was projected from the 1970 census. The 1980 census was probably more reliable with respect to Indian data than the 1970 census (see ch. 3). After the 1980 census, IHS recalculated its population estimates for 1971 to 1979 in order to show a more gradual transition to the population enumerated during the 1980 census (see table 4-3). OTA took account of the revised population estimates to calculate death and hospital discharge rates for periods prior to 1980.

Mortality Data.—A great deal of the discussion in this chapter relies on mortality information as an index of health status, but the source of such

Table 4-3.—Estimated Indian and Alaska Service Population by Area, 1970-80,ᵃ Including Revised 1971-79 Estimates

Area	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Aberdeen area	44,290	45,870	47,443	49,020	50,595	52,814	54,385	55,968	57,546	61,607	63,253
Alaska	50,654	51,916	53,179	54,440	55,700	57,198	58,454	59,710	60,964	62,223	64,047
Albuquerque	33,109	34,573	36,035	37,496	38,960	40,426	41,886	43,350	44,811	45,360	46,610
Bemidji	21,674	23,050	24,423	25,799	27,165	32,457	34,115	35,780	37,444	39,963	42,686
Billings	27,127	27,859	28,589	29,274	30,951	31,734	32,496	33,262	34,024	34,932	35,708
California[b]	—	—	—	—	—	—	—	—	57,803	61,324	65,757
Nashville	8,539	8,824	9,559	9,866	11,947	12,314	12,672	13,037	22,729	25,910	26,731
Navajo	91,553	96,476	101,396	106,317	111,237	116,161	121,078	126,000	130,919	138,531	145,162
Oklahoma City	98,976	106,416	113,548	120,691	128,000	135,168	142,290	149,444	156,587	165,448	172,636
Phoenix	49,241	51,652	54,057	56,467	58,875	61,296	63,695	66,108	68,649	71,565	74,020
Portland	25,081	26,803	28,528	30,248	31,974	34,908	36,586	38,367	40,140	68,041	75,769
Tucson	9,752	10,401	11,047	11,696	12,343	12,992	13,639	14,287	14,935	15,582	16,230
All areas	459,996	483,840	507,804	531,314	557,747	587,468	611,296	635,313	726,551	790,486	828,609

[a] Estimates are based on U.S. Census counts for 1970 and 1980, and NCHS information on Indian births and deaths, 1970-80.

[b] Did not become IHS service area until 1978.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, Population Statistics Staff, internal document, Rockville, MD, Feb. 1, 1985.

data has several limitations, only some of which are specific to data about Indians. The most important Indian-specific limitation is that in many areas Indians may be identified as belonging to a non-Indian ethnic group. As mentioned above, this is highly likely in California, where many Indians have Hispanic surnames; it also may be true for nonreservation Indians everywhere (e.g., Oklahoma, urban areas). Another limitation is that the mortality tapes that NCHS provides to IHS contain information only about the underlying (chief) cause of death, and not on other contributing causes of death. This is a problem in investigating the contribution of illnesses such as alcoholism and drug abuse to mortality rates.

Perhaps the most serious limitation of using mortality data is that such information may not identify the actual causes of death. For example, using the autopsy as a measure of accuracy of the death certificate in a Connecticut sample, Kircher and his colleagues found major disagreement on the major ICD-9 (International Classification of Diseases, 9th Edition) classifications (e.g., diseases of the heart) for causes of death in 29 percent of deaths, and disagreement on the specific cause in another 26 percent of deaths (63). Circulatory disorders, ill-defined conditions, and respiratory diseases were the most overdiagnosed; specific traumatic conditions (suicide, homicide, or accident) and gastrointestinal disorders were the most underdiagnosed. Similar findings have been reported in other studies (199).

Patient Care Information.—In both IHS's and NCHS's hospital discharge and ambulatory patient care information systems, data are collected for each hospital discharge and for each outpatient visit (encounter), not for each patient. Therefore, a number of hospital discharge records and, more likely, outpatient visit records, could be for a single patient. Medical records are, of course, kept for all patients in each facility they visit, but these records are not linked in an electronically accessible data system.

Comparisons of the prevalence and incidence of illnesses between IHS and U.S. all races populations are difficult to make because of differences between IHS's data system and those of the National Center for Health Statistics. For outpatient information, NCHS collects data from office-based physicians (200). The IHS health care system relies heavily on nonphysicians (see ch. 4), so comparisons between IHS and U.S. all races outpatient care are not exact. Further, IHS uses a different outpatient diagnostic coding system and aggregates data from this system in a nonstandard way (168). Also current IHS reporting systems exclude diagnostic data from several important sources of health services delivery. These include contract outpatient providers, most tribally managed facilities, and urban providers. Systematic data on the prevalence of mental health problems and the utilization of mental health services are lacking for both Indians and U.S. all races populations.

Some difficulties also arise from IHS's use of the concept "clinical impression." Clinical impression refers to the diagnosis first suspected by the examining physician at the initial visit; it may not be the final diagnosis. This has several implications for morbidity analyses based on APC data. For example, IHS had used APC records to derive incidences of diseases considered "notifiable" by the U.S. Centers for Disease Control (e.g., measles, syphilis) and other communicable diseases recognized as important sources of morbidity in Indian communities (e.g., otitis media). These data made it appear as if Indians were suffering from notifiable and communicable diseases at a much greater rate than the U.S. all races population, when in fact such incidence rates included mistaken, perhaps overcautious, diagnoses. For example, a validity check of a count of several hundred clinical impressions of measles turned up only one actual case. For this reason, IHS no longer publishes such information, although it can still be obtained from APC records (58).

Comparisons With IHS Publications.—For certain statistical calculations (e.g., mortality rates reported in the *Chart Series Book* published in 1984 and 1985) the IHS uses census counts of the total American Indian and Alaska Native population residing in all reservation States, and the total number of Indian deaths in those States, to calculate national Indian death rates. In these cases, the nonservice population (those who do not reside in the geographic areas in which IHS has responsibilities), are included in IHS's calculations. IHS uses this method in order to be able to compare current Indian health status with Indian health status in 1955 (26), when IHS became responsible for providing Indian health care but IHS service areas as they are now known had not been organized. However, the number of reservation States and the Indian population base has changed considerably since 1955, so even these comparisons should be made extremely cautiously. At the time this report was being prepared, IHS was conducting a congressionally requested study of health parity which will include reports on Indian mortality in individual IHS service areas, including age-adjusted mortality rates. OTA's analysis has generally focused on IHS's service population. Consequently, OTA's rates may differ from some of IHS's published rates. These differences are identified in the following analyses. In the 3-year period centered in 1981, there were an estimated 15,321 deaths among IHS's service population, and another 4,408 deaths in the nonservice population.

Comparisons Over Time.—A report published in 1979 included mortality rates for IHS areas for the 3-year periods centered in 1973 and 1976 (157), but these were not adjusted for age and so were not comparable to rates for the U.S. all races. They are used in OTA's analysis to make rough estimates of changes in health status over the decade for which data on IHS areas are available. These estimates should be interpreted cautiously because of changes over time in a number of other factors: the IHS population base (as a result of, for example, "termination" and subsequent rerecognition of tribes as federally recognized); changes in census methods; and changes in IHS service area boundaries.

OVERVIEW OF HEALTH STATUS

Overall Indian health status relative to the health of "U.S. all races" combined can be presented in several ways: the age distribution of deaths, differing causes of death, and differing patterns of health care utilization. In this section these health indicators are averaged for Indians in all IHS service areas, and comparisons across IHS services areas are made. Then, the health status of Indians in each IHS area is analyzed. These analyses indicate that while there has been steady improvement, in almost every IHS area and on almost every health indicator, Indian health remains poorer than that of the U.S. population in general. Further, there appear to be significant differences in health care utilization, which may be indicators of unmet need.

Age Distribution of Deaths

Perhaps the most significant indicator of Indian health status is that Indians do not live as long as other U.S. populations. In the early 1950s, 56 percent of Indian deaths occurred in individuals younger than age 45 (155). By 1982, that had only improved to 37 percent of Indian deaths occurring to those younger than 45, compared with only 12 percent of U.S. all races deaths occurring in that age group (see figure 4-1). Indians' higher birth rate (see ch. 3) contributes to a younger population (see figure 4-2) and thus more deaths among younger Indians. However, the more problematic health status of younger Indians is reflected by the fact that Indian mortality rate (deaths relative to population) exceed the rates for the U.S. all races in every age group below age 75; the difference is especially pronounced in the years 15 through 44 (see table 4-4 and figure 4-3).

In the 3-year period centered in 1981, 345,430 years of potential life were lost by Indians who died before their 65th birthdays. Per 100,000 population, the Indian rate of potential years of life lost was approximately two times that of the U.S. all races rate.

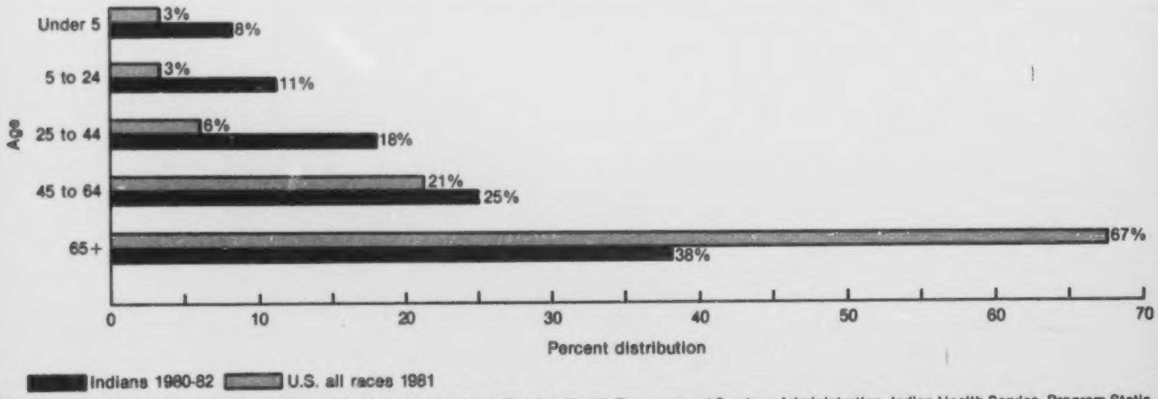
Rates and Causes of Death

In 1980 to 1982, the *average* age-adjusted mortality rate for all IHS service areas excluding California was 778.3 per 100,000, a rate 1.4 times that of U.S. all races. Rates ranged from 1,261.3 in Aberdeen to 530.6 in the Oklahoma City area. (Existing data on the health status of Indians in California is too incomplete to use, so death rates attributed to this group are not included.) These figures differ markedly from those published by the Indian Health Service in 1985, because, as discussed above, IHS typically averages all reported Indian deaths in all parts of all reservation States, whether the IHS has service delivery responsibilities throughout the State or not. For the 1980-82 period, IHS's method resulted in an average age-adjusted overall mortality rate for Indians of 568.9, essentially equal to that of the U.S. all races (see table 4-5).

Leading Causes of Death

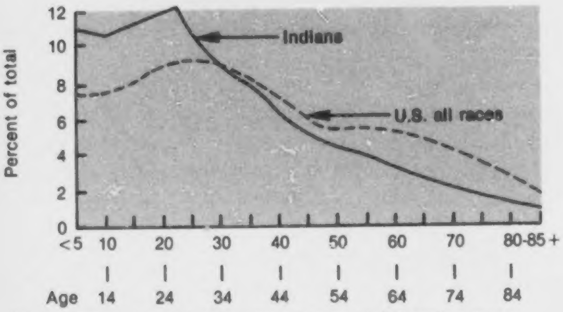
In the 3-year period centered in 1981, the 15 leading causes of death for Indians in IHS areas were heart disease, accidents, cancer, liver disease and cirrhosis, cerebrovascular disease, pneumonia, diabetes, suicide, homicide, conditions originating in the perinatal period (the period right around birth), nephritis, nephrotic syndrome and nephrosis, congenital anomalies (birth defects), chronic pulmonary diseases, septicemia, and tuberculosis (see table 4-6). While there are substantial differences among IHS areas in mortality and health care utilization rates, the pattern of disease

Figure 4-1.—Percent Distribution Deaths by Age Indians 1980-82 and U.S. All Races 1981



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resource and Services Administration, Indian Health Service, Program Statistics Branch, "Chart Series Book," Rockville, MD, April 1985.

Figure 4-2.—Population by Age, Indians in Reservation States[a] and U.S. All Races 1980

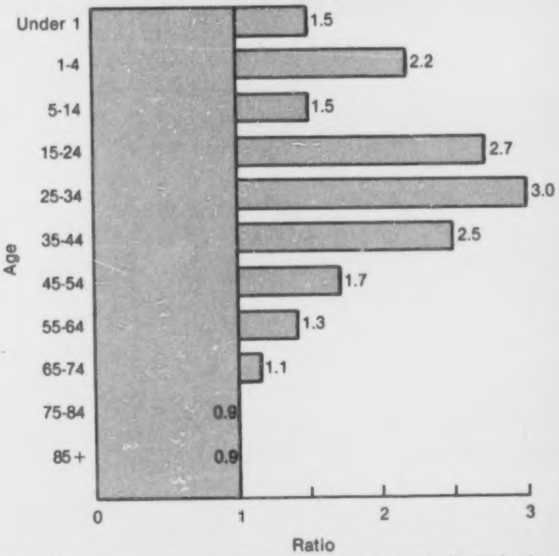


[a]Used by IHS to infer age distribution of Indians in IHS service areas.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, "Chart Series Book," Rockville, MD, April 1985.

and death is essentially consistent across IHS areas (see table 4-7). (For the number of deaths, age-specific and age-adjusted mortality rates, and ratios to U.S. all races rates for 72 selected causes of death in all areas excluding California, see app. B.) As shown in tables 4-8 and 4-9, the leading causes of death among Indians have changed somewhat over the past 30 years. Since 1951 there has been significant improvement in infectious diseases only to have the so-called "social" or behavioral causes of mortality (accidents, suicide, homicide) become prominent.

Figure 4-3.—Age-Specific Mortality Rates Ratio of Indians in IHS Service Areas 1980-82 to U.S. All Races 1981



SOURCE: U.S. Department of Health and Human Service, Indian Health Service, Office of Administration and Management, 1985.

Diseases of the heart have been the leading cause of death for U.S. all races for some time. They are now the leading cause of death for Indians in IHS service areas, although there are still

Table 4-4.—Age-Specific and Age-Adjusted Mortality Rates of Indians in IHS Areas (excluding California), 1980-82, U.S. All Races, White and All Other Races, 1981 (rate per 100,000 population)

Age	IHS service area Indians 1980-82		United States-1981 mortality rates			Ratio of rates
	Number of deaths[a]	Mortality rate	All races	White	All other	Indians to U.S. all races
<1	1,021	1,834.8	1,207.3	1,062.0	1,786.5	1.5
1 to 4	249	129.5	60.2	54.3	87.3	2.2
5 to 14	228	43.1	29.4	28.0	35.6	1.5
15 to 24	1,522	285.5	107.1	104.6	120.0	2.7
25 to 34	1,459	397.1	132.1	116.2	226.2	3.0
35 to 44	1,312	555.4	221.3	192.5	508.2	2.5
45 to 54	1,625	950.5	573.5	524.9	921.0	1.7
55 to 64	2,082	1,694.8	1,322.1	1,255.7	1,890.8	1.3
65 to 74	2,422	3,081.5	2,922.3	2,855.9	3,531.9	1.1
75 to 84	2,097	6,097.0	6,429.9	6,423.4	6,478.6	0.9
>85	1,310	13,325.2	15,379.7	15,628.0	12,547.9	0.9
Age-adjusted rate		778.3	568.2	544.6	732.6	1.4

NOTE: Excludes 14 deaths for which age at death was unknown.

SOURCES: **Indian data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **U.S. data:** U.S Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report—Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3): supp., June 22, 1984.

Table 4-5.—Age-Adjusted Death Rates for U.S. All Races 1981, Indians in Reservation States, and Indians in IHS Service Areas (excluding California) 1980-82, in Order by Rate (rate per 100,000 population)

	Age-adjusted mortality rate
U.S. all races 1981	568.2
IHS published rate—Indians in 28 reservation States	568.9
IHS areas—total	778.3
Aberdeen	1,261.3
Billings	1,260.3
Tucson	1,011.1
Bemidji	943.5
Phoenix	918.2
Alaska	918.1
Nashville	765.4
Portland	749.8
Albuquerque	703.1
Navajo	656.3
Oklahoma City	530.6

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report of Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984. **IHS published data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Indian Health Service Chart Series Book April 1985* (Rockville, MD: IHS, 1985). **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

almost as many deaths from accidents. On average, the Indian death rate from diseases of the heart is slightly lower than the rate for U.S. all races combined (and for U.S. whites). However, as shown in table 4-10, relative to U.S. all races, mortality from heart disease is greater among younger Indians than among younger people of other U.S. populations, and there is considerable variation among IHS areas in mortality due to heart disease. The death rate from heart disease is considerably lower than the U.S. all races rate in most areas, but the heart disease death rate exceeds that of U.S. all races in four IHS areas: Aberdeen, Bemidji, Billings, and Nashville (see figure 4-4). The reasons for these differences are unclear; heart disease is a matter of increasing concern to providers of Indian health care in all IHS areas (111).

The accident mortality rate for Indians in IHS service areas is on average 3.4 times the U.S. all races rate. In seven IHS areas, accidents are still the leading cause of death, and there was no IHS area that did not have a mortality rate from accidents at least 2.2 times the U.S. all races rate (figure 4-5). In general, accidents and other external causes are the leading cause of death among U.S. youth (92); among Indians, the accidental death toll among the young is far worse than among other U.S. populations (table 4-11). The excess Indian risk of death from accidents has many causes, but those related to motor vehicles predominate. Long distances between destinations, poor roads, overcrowded and unsafe vehicles, and driving under the influence of alcohol are among the major causes of motor vehicle deaths among Indians.

Cancer (malignant neoplasms) is the third leading cause of death among the IHS's service population, having accounted for 1,713, or 11.2 percent, of Indian deaths in 1980 to 1982. Although on average the cancer mortality rate among Indians is lower than that of U.S. all races, there is considerable variability among IHS areas, and the Indian cancer mortality rate exceeds that of U.S. all races in five IHS areas: Aberdeen, Alaska, Bemidji, Billings, and Nashville (figure 4-6). Substantial cancer death rates for particular organ systems in specific IHS areas, such as mortality from cancer of the digestive system in both the Aberdeen and Alaska areas, are masked by aggregating cancer rates. The tendency of American Indians to have higher than average death rates from cancer was noted tentatively in the journal of the National Cancer Institute (NCI), but the small numbers of Indians in NCI's epidemiologic survey kept them from being able to demonstrate statistically significant differences from other populations (223).

Alcohol abuse is implicated in Indian death and illnesses from many causes; e.g., accidents, suicide, homicide, diabetes, congenital anomalies in infants, pneumonia, heart disease, and cancer. It has also been implicated in 50 percent of adult crime on Indian reservations (204,205,206,207). The prevalence of alcohol abuse can be inferred from the extremely high liver disease and cirrhosis death rates in almost all IHS areas. In 1980 to 1982, there were 801 deaths which listed liver disease and cirrhosis as the underlying (chief) cause, for an age-adjusted death rate of 48.1 per 100,000, exceeding the U.S. all races rate by 4.2 times. In one area the ratio to U.S. all races was almost 10:1, and there was no IHS area in which the In-

Table 4-6.—American Indian Deaths and Age-Adjusted Death Rates All IHS Areas (excluding California) for 15 Leading Causes 1980-82 Compared to Age-Adjusted Death Rates for U.S. All Races 1981

IHS code[a]	Rank[b]	Cause name	American Indian: Number of deaths	American Indian: Age-adjusted rate[c]	U.S. all races: Age-adjusted rate	Ratio American Indian to U.S. all races
Both sexes combined:						
310	1.	Diseases of the heart	3,058	166.7	195.0	0.9
790	2.	Accidents/adverse effects	2,946	136.3	39.8	3.4
150	3.	Malignant neoplasms	1,713	98.4	131.6	0.7
620	4.	Liver disease/cirrhosis	801	48.1	11.4	4.2
430	5.	Cerebrovascular diseases	664	33.8	38.1	0.9
510	6.	Pneumonia/influenza	580	26.6	12.3	2.2
260	7.	Diabetes mellitus	470	27.8	9.8	2.8
830	8.	Homicide	458	21.2	10.4	2.0
820	9.	Suicide	447	19.4	11.5	1.7
740	10.	Conditions arising in perinatal period	331	9.8	9.2	1.1
640	11.	Nephritis, et al.	229	12.4	4.5	2.8
730	12.	Congenital anomalies	205	6.5	5.8	1.1
540	13.	Chronic pulmonary diseases	177	9.6	16.3	0.6
090	14.	Septicemia	122	6.5	2.9	2.2
030	15.	Tuberculosis	77	4.2	0.6	7.0
		All others	3,043	151.0	69.0	2.2
ALL	...	All causes	15,321	778.3	568.2	1.4
Female:[c]						
310	1.	Diseases of the heart	1,234	121.5	135.1	0.9
150	2.	Malignant neoplasms	827	89.4	108.6	0.8
790	3.	Accidents/adverse effects	781	69.0	20.4	3.4
620	4.	Liver disease/cirrhosis	351	40.1	7.4	5.4
430	5.	Cerebrovascular diseases	334	31.3	35.4	0.9
260	6.	Diabetes mellitus	261	28.8	9.6	3.0
510	7.	Pneumonia/influenza	241	21.0	9.2	2.3
740	8.	Conditions arising in perinatal period	127	7.5	8.2	0.9
640	9.	Nephritis, et al.	125	12.8	3.6	3.6
830	10.	Homicide	125	11.7	4.3	2.7
730	11.	Congential anomalies	102	6.5	5.5	1.2
820	12.	Suicide	66	5.4	5.7	1.0
090	13.	Septicemia	65	6.5	2.4	2.7
540	14.	Chronic pulmonary diseases	54	5.6	9.5	0.6
480	15.	Atherosclerosis	43	3.5	4.6	0.8
		All others	1,258	118.1	50.9	2.3
ALL	...	All causes	5,994	578.7	420.4	1.4
Male:[c]						
790	1.	Accidents/adverse effects	2,165	207.8	60.2	3.5
310	2.	Diseases of the heart	1,824	219.0	271.2	0.8
150	3.	Malignant neoplasms	886	109.1	163.7	0.7
620	4.	Liver disease/cirrhosis	450	57.0	16.0	3.6
820	5.	Suicide	381	34.0	18.0	1.9
510	6.	Pneumonia/influenza	339	33.2	16.6	2.0
830	7.	Homicide	333	31.1	16.7	1.9
430	8.	Cerebrovascular diseases	330	37.0	41.7	0.9
260	9.	Diabetes mellitus	209	26.7	10.0	2.7
740	10.	Conditions arising in perinatal period	204	12.0	10.3	1.2
540	11.	Chronic pulmonary diseases	123	14.2	26.2	0.5
640	12.	Nephritis, et al	104	12.0	5.6	2.1
730	13.	Congenital anomalies	103	6.5	6.1	1.1
840	14.	All other external causes	97	10.0	2.2	4.5
090	15.	Septicemia	57	6.5	3.4	1.9
		All others	1,722	182.7	85.4	2.1
ALL	...	All causes	9,327	998.8	753.3	1.3

[a] Comparable to ICD-9 codes; available from IHS.

[b] Ranked by number of deaths.

[c] Note that age and sex distributions are calculated for reservation States and may or may not reflect age and sex distribution in IHS areas.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Table 4-7.—Fifteen Leading Causes of Death and Age-Adjusted Death Rates[a] Ranked[b] for U.S. All Races 1981 and IHS Areas 1980-82
(rate per 100,000 population)

Cause	U.S. (rank) (rate)	All IHS areas (excluding California) (rank) (rate)	Aberdeen (rank) (rate)	Alaska (rank) (rate)	Albuquerque (rank) (rate)	Bemidji (rank) (rate)	Billings (rank) (rate)	California (rank) [c]	Nashville (rank) (rate)	Navajo (rank) (rate)	Oklahoma (rank) (rate)	Phoenix (rank) (rate)	Portland (rank) (rate)	Tucson (rank) (rate)
Diseases of the heart	1 195.0	1 166.7	1 289.0	2 165.1	2 80.1	1 328.0	2 282.6	1 —	1 224.9	2 77.3	1 146.4	2 177.8	2 170.3	2 171.6
Malignant Neoplasms	2 131.6	3 98.5	3 154.2	3 138.2	3 82.0	3 150.4	3 156.8	3 —	2 126.0	3 76.6	2 85.7	4 76.0	4 73.9	4 71.9
Cerebrovascular disease	3 38.1	5 33.8	7 49.9	4 45.7	8 23.6	4 53.6	6 44.6	4 —	4 52.2	6 17.1	4 29.7	9 34.2	5 39.8	10 26.7
Accidents/adverse conditions	4 39.8	2 136.3	2 182.3	1 210.5	1 124.4	2 130.7	1 236.1	2 —	3 90.9	1 165.7	3 66.9	1 150.0	1 125.6	1 143.8
Chronic pulmonary disease	5 16.3	13 9.6	12 16.7	10 14.2	—[d] —	9 20.4	11 27.6	10 —	—[d] —	15 4.6	11 7.3	14 8.3	11 12.6	—[d] —
Pneumonia/influenza	6 12.3	6 26.6	5 48.1	5 35.4	7 23.5	6 26.7	8 35.3	9 —	6 25.9	4 28.6	7 13.7	5 41.3	8 22.0	7 33.0
Diabetes Mellitus	7 9.8	7 27.8	10 44.6	—[d] —	6 35.9	7 30.7	9 38.4	7 —	5 39.9	11 14.1	5 26.9	7 45.4	7 24.7	6 54.2
Liver disease/cirrhosis	8 11.4	4 48.1	4 98.9	9 27.1	4 47.0	5 36.3	4 112.2	5 —	7 30.8	5 21.4	6 25.4	3 87.3	3 71.7	3 81.3
Atherosclerosis	9 5.2	—[d] —	—[d] —	15 3.9	14 3.6	11 11.2	—[d] —	13 —	—[d] —	—[d] —	15 3.2	—[d] —	—[d] —	—[d] —
Suicide	10 11.5	9 19.5	8 37.4	8 21.4	5 29.3	8 18.1	7 33.4	8 —	9 17.4	9 12.3	12 6.9	8 28.2	6 21.1	5 42.2
Homicide and legal intervention	11 10.4	8 21.2	6 45.2	6 25.5	9 15.4	10 11.9	5 36.4	6 —	8 22.5	7 15.0	8 12 6	6 35.5	10 17.2	9 23.8
Conditions arising in perinatal period	12 9.2	10 9.8	9 17.9	7 15.3	12 4.8	12 6.2	10 12.3	12 —	10 13.8	12 5.2	9 9.2	11 9.7	9 11.9	—[d] —
Nephritis, et al	13 4.5	11 12.4	11 23.4	13 9.0	11 15.1	15 9.9	12 14.2	11 —	12 5.4	10 13.1	10 7.7	10 21.6	12 11.8	12 23.6
Congenital anomalies	14 5.8	12 6.5	13 6.4	11 6.8	10 7.8	13 5.7	15 4.5	— —	—[d] 5.2	11 5.2	8 8.4	13 4.7	12 7.7	14 6.3
Septicemia	15 2.9	14 6.5	—[d] —	—[d] —	13 9.5	14 8.5	13 4.9	— —	13 4.2	13 5.0	14 4.4	13 8.3	14 6.0	8 27.6
Tuberculosis	—[d] 0.6	15 4.2	14 9.4	12 10.1	— —	— —	—[d] —	14 —	—[d] —	—[d] —	— —	—[d] —	—[d] —	13 15.9
All others	— 63.8	— 150.8	— 237.9	— 189.9	— 201.1	— 95.2	— 221.0	— —	— 106.3	— 195.1	— 76.2	— 189.9	— 133.5	— 289.2
All causes	— 568.2	— 778.3	— 1,261.3	— 918.1	— 703.1	— 943.5	— 1,260.3	— —	— 765.4	— 656.3	— 530.6	— 918.2	— 749.8	— 1,011.1

[a] Both sexes combined. Rates and rank may differ substantially by sex; see text. See app. B for deaths and rates for 72 causes.

[b] Ranked by number of deaths in order to be consistent with NCHS methods. Order by age-adjusted mortality rates may be different.

[c] Valid rates not available; see text for fuller explanation.

[d] Not among 15 leading causes of death.

SOURCES: **U.S. all races:** Department of Health and Human Services, Public Health Service, National Center for Health Statistics, *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **IHS Areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Table 4-8.—Leading Causes of Indian Deaths 1951-53 and U.S. All Races 1952

Cause	Percent of all causes
Indians 1951-52:[a]	
Heart diseases	14.2
Accidents	14.1
Influenza and pneumonia	10.5
Tuberculosis, all forms	8.1
Certain diseases of early infancy	7.1
Malignant neoplasms	5.9
Gastritis, duodenitis, enteritis, and colitis	5.9
Vascular lesions affecting central nervous system	4.3
Congenital malformations	1.6
Homicide and legal execution	1.6
All races 1952:	
Heart diseases	37.1
Malignant neoplasms	14.9
Vascular lesions affecting central nervous system	11.1
Accidents	6.4
Certain diseases of early infancy	4.3
Influenza and pneumonia	3.1
General arteriosclerosis	2.1
Diabetes mellitus	1.7
Tuberculosis, all forms	1.6
Congenital malformations	1.3

[a] Based on mortality data for populaton of 460,000 Indians in 23 reservation States.

SOURCE: U.S. Department of Health, Education, and Welfare, *Health Services for American Indians* (Washington, DC: U.S. DHEW, 1957).

dian rate was below the U.S. all races rate (see figure 4-7). Despite a long-standing recognition that alcohol abuse is the major health problem of American Indians (156), there is still no agreement on either the causes or treatment for this problem among Indians (66,72).

Cerebrovascular diseases (diseases of the circulatory system affecting the brain) are the fifth leading cause of death among IHS area Indians on average. Like the death rate from diseases of the heart, the mortality rate from cerebrovascular disease is on average lower among Indians than among U.S. all races. It substantially exceeds the U.S. all races rate in the same IHS service areas as for heart disease (Aberdeen, Bemidji, Billings, Nashville), plus Alaska (see figure 4-8).

In the 1950s pneumonia and influenza combined were the third leading cause of Indian deaths; in the 3-year period centered in 1981, pneumonia and influenza had declined to the sixth leading cause of Indian death. However, the age-adjusted rate of 26.6 Indian deaths per 100,000 population compares unfavorably to the U.S. all races rate for 1981 of 12.2. Pneumonia is largely

Table 4-9.—Crude Death Rates for 3 Year Periods Centered in 1973, 1976, and 1981 for Indians in 11 IHS Areas,[a] 15 Leading Causes of Death (rate per 100,000 population, not adjusted for age)

IHS code	Cause	1972-74 rate	1975-77 rate	1980-82 rate
790	Accidents/adverse conditions	186.1	158.6	125.5
800	Motor vehicles	104.2	91.1	71.1
810	All other accidents	82.0	67.5	54.4
310	Diseases of the heart	141.8	126.6	130.3
150	Malignant neoplasms	70.6	67.8	73.0
620	Liver disease/cirrhosis	46.2	44.3	34.2
430	Cerebrovascular disease	42.5	35.8	28.3
510	Pneumonia/influenza	43.0	35.9	24.7
260	Diabetes mellitus	22.2	19.9	20.0
830	Homicide	22.6	21.3	19.5
820	Suicide	22.0	23.7	19.0
740	Conditions arising in perinatal period	22.8	21.2	14.1
640	Nephritis, et al	6.2	5.3	9.8
730	Congenital anomalies	10.0	9.9	8.7
90	Septicemia	5.7	6.1	5.2
30	Tuberculosis	8.9	7.0	3.3
480	Atherosclerosis	7.3	7.0	3.2
	All other causes	180.3	154.7	134.0
All	All causes	838.2	745.1	652.8

[a] Excludes California which did not become an IHS service area until 1978.

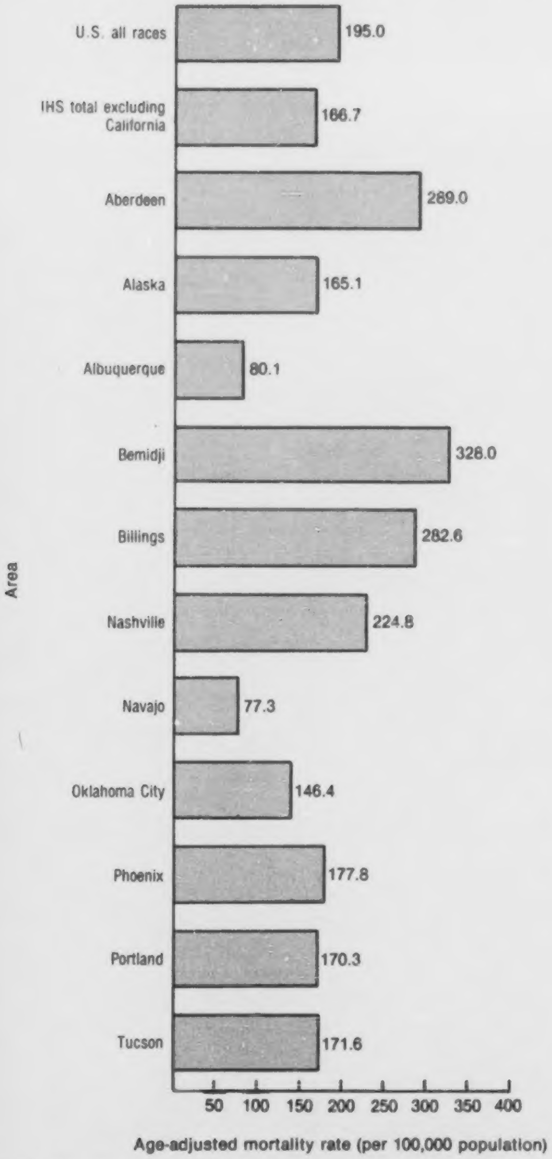
SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education, and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA) 79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-77 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, Population Statistics Staff, Internal document, Rockville, MD, Feb. 1, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape provided to the Office of Technology Assessment, Washington, DC, 1985.

Table 4-10.—Mortality Rates From Diseases of the Heart by Age: Indians in 11 IHS Areas 1980-82 and U.S. All Races 1981 (rate per 100,000 population)

Age group	Indians in IHS areas (excluding California) 1980-82	U.S. all races 1981	Ratio IHS to U.S. all races
0 to 4	14.5	106.1	0.1
5 to 14	0.9	0.9	1.0
15 to 24	5.3	2.6	2.0
25 to 34	15.2	8.4	1.8
35 to 44	55.9	43.2	1.3
45 to 54	172.6	177.7	1.0
55 to 64	454.2	481.5	0.9
65 to 74	1,024.2	1,175.8	0.9
75 to 84	2,064.3	2,850.3	0.7
>85	4,363.8	7,459.0	0.6

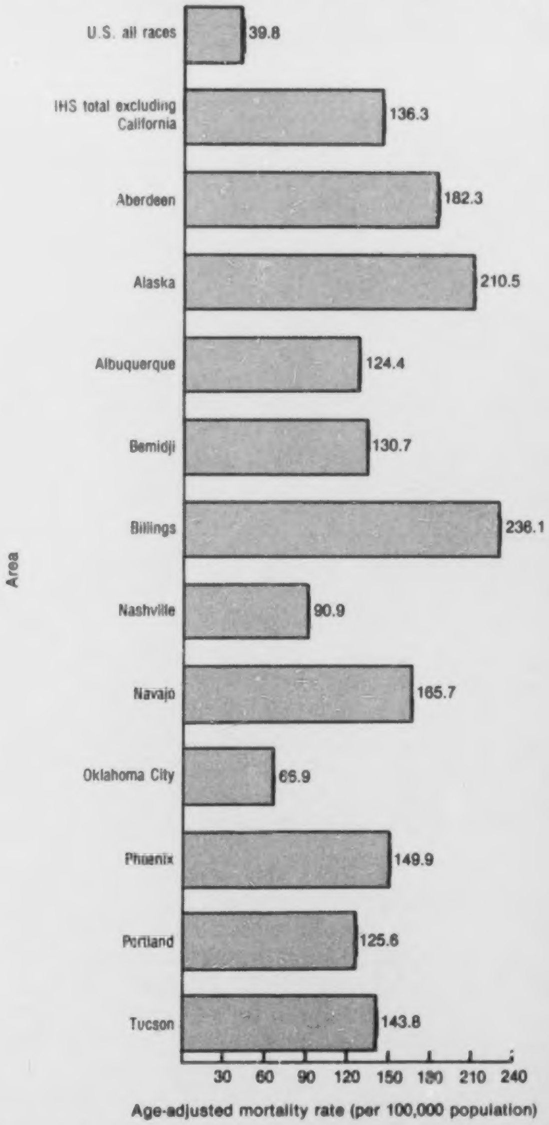
SOURCES: **Indian data:**U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **U.S. all races data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report of Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984.

Figure 4-4.—Age-Adjusted Death Rates for Diseases of the Heart, American Indians in 11 IHS Areas (excluding California) 1980-82



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-5.—Age-Adjusted Death Rates for Accidents and Adverse Conditions, American Indians in 11 IHS Areas (excluding California) 1980-82



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Table 4-11.—Mortality Due to Accidents by Age Indians in IHS Areas (excluding California) 1980-82 and U.S. All Races 1981 (rate per 100,000 population)

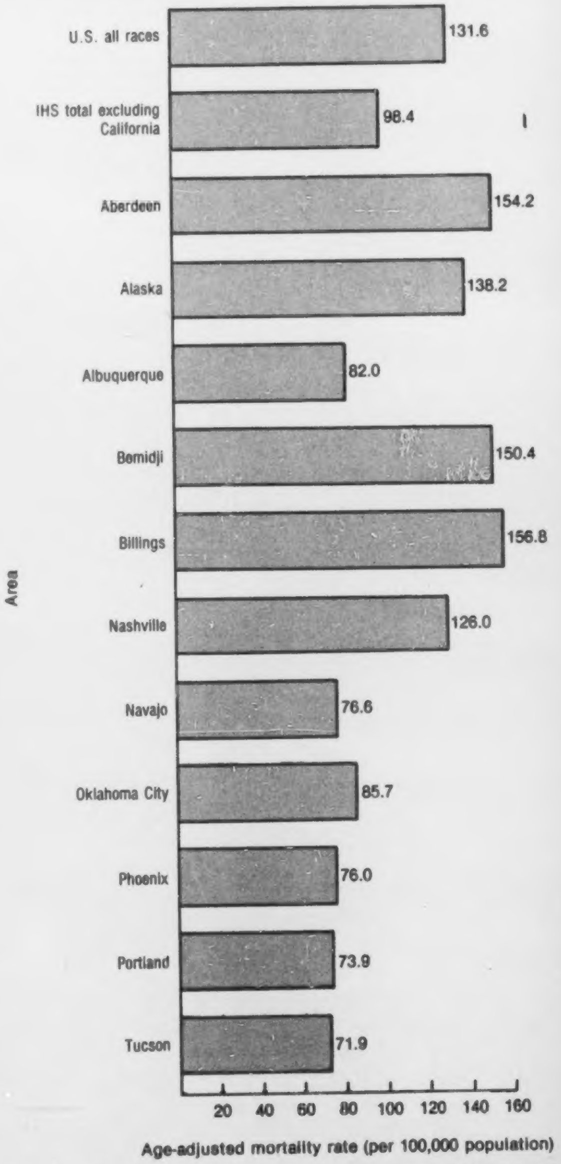
Age group	IHS area Indians	U.S. all races	Ratio IHS area Indians to U.S. all races
<1	27.0	27.3	1.0
1 to 4	88.0	23.6	3.7
5 to 14	26.1	14.2	1.8
15 to 24	164.2	56.0	2.9
25 to 34	182.0	45.1	4.0
35 to 44	159.2	35.7	4.5
45 to 54	159.7	37.7	4.2
55 to 64	170.1	40.4	4.2
65 to 74	170.5	54.3	3.1
75 to 84	209.3	108.2	1.9
>85	356.0	273.3	1.3
Age-adjusted rate . . .	136.2	39.8	3.4

SOURCES: **Indian data:**U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **U.S. all races data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report of Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984.

responsible for the high Indian death rate in this category. In the 3-year period centered in 1981, all IHS areas had pneumonia mortality rates higher than the U.S. all races rate (see figure 4-9). The pneumonia mortality rate for Indians exceeded the U.S. all races rate in all age groups, but particularly among the very young and those between 25 and 55 (table 4-12). This widespread problem with pneumonia mortality indicates that a variety of causes may be responsible (e.g., inadequate access to care (see below), alcohol abuse (100)).

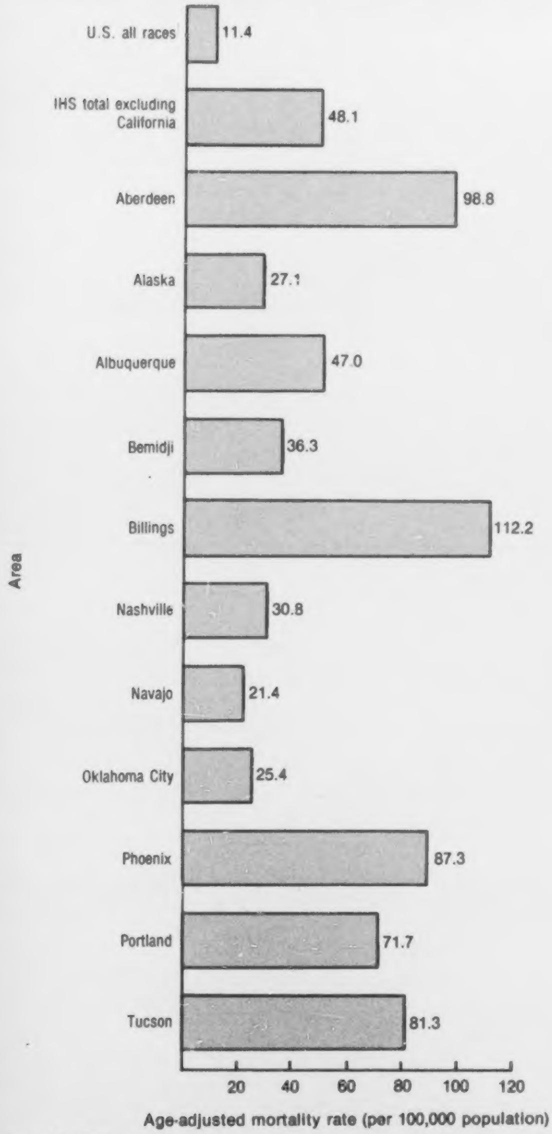
Diabetes mellitus is the seventh leading cause of death among the IHS service population and has been identified as a growing problem. Despite a drop in crude death rates from diabetes between 1972 and 1982, the age-adjusted death rate in IHS areas exceeds that of U.S. all races in every area but Alaska, where diabetes is not even among the 15 leading causes of death (see figure 4-10). The overall diabetes death rate in IHS areas exceeded the U.S. all races rate by 2.8 times, exceeding it by 5.2 times in the Aberdeen area.

Figure 4-6.—Age-Adjusted Death Rates for Malignant Neoplasms (Cancer), American Indians in 11 IHS Areas (excluding California) 1980-82



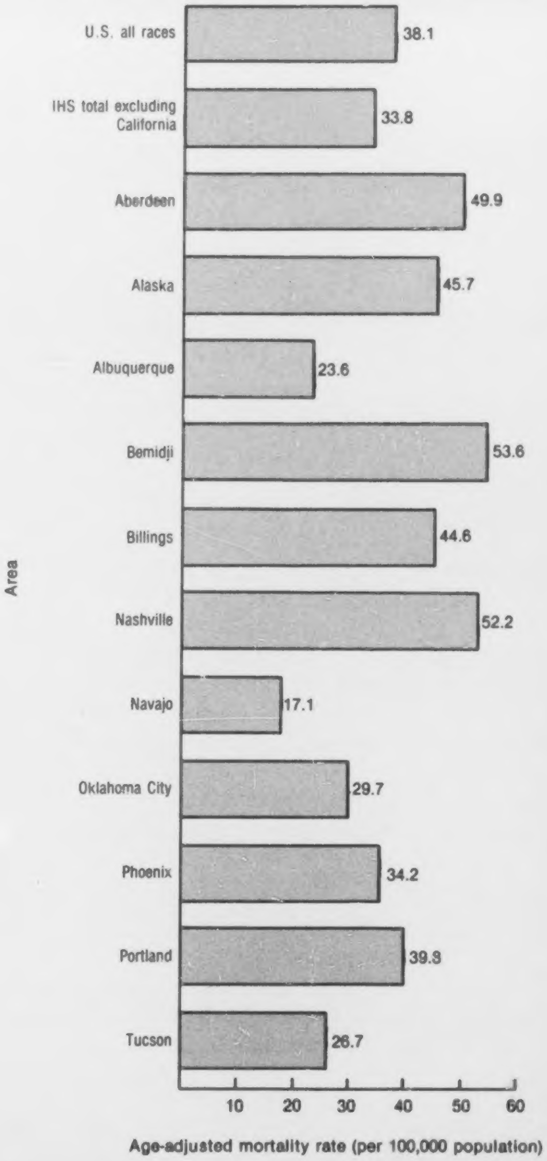
SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-7.—Age-Adjusted Death Rates for Liver Disease and Cirrhosis, American Indians in 11 IHS Areas (excluding California) 1980-82



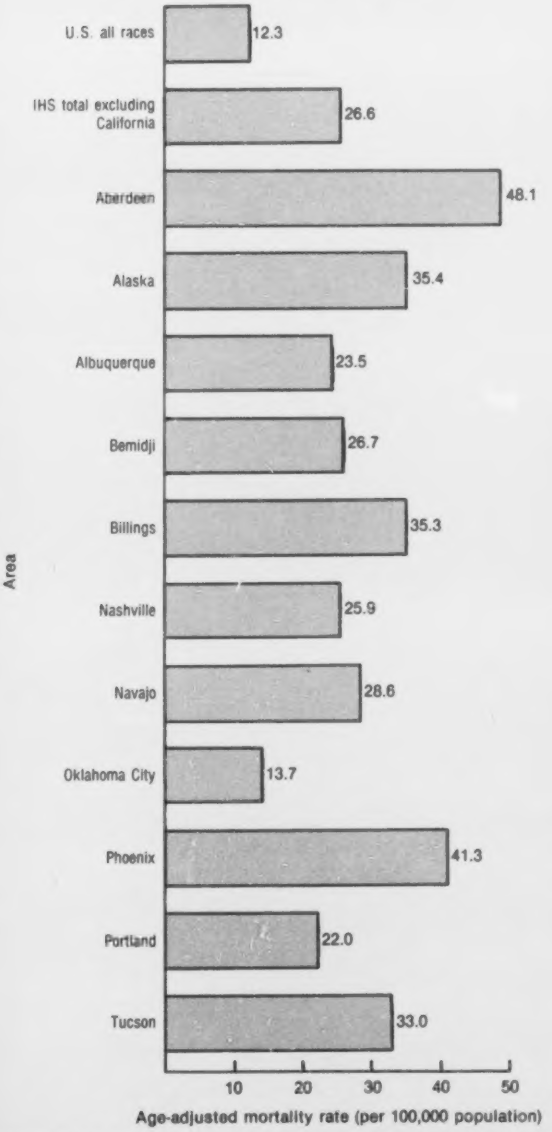
SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-8.—Age-Adjusted Death Rates for Cerebrovascular Disease, American Indians in 11 IHS Areas (excluding California) 1980-82



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-9.—Age-Adjusted Death Rates for Pneumonia, American Indians in 11 IHS Areas (excluding California) 1980-82



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

While homicide and suicide are the 11th and 10th leading causes of death for U.S. all races, on average they are the 8th and 9th leading causes of death, respectively, among IHS service area Indians. There was no IHS area with a homicide mortality rate less than that of U.S. all races (figure 4-11), and there was no Indian age group with a homicide mortality rate less than that of U.S. all races. (The rate for blacks, which is the highest of all U.S. populations, exceeds that for Indians, at a ratio of 2:1 for males.) On average the Indian homicide rate in IHS areas was twice that for U.S. all races, with ratios as high as 6.3:1 among Aberdeen area females (see figure 4-12).

Although the crude death rate from Indian suicide has apparently declined since the 3-year period centered in 1973, the age-adjusted rate still exceeded the U.S. all races rate by a ratio of 1.7:1. Suicide tends to claim the lives of young Indians; as shown in table 4-13, the Indian age-specific death rates for suicide exceeded those of U.S. all races for all age groups up to age 44, with a 3.2:1 ratio in the 15 to 24 age group. Hypotheses about the causes of suicide vary. Despair and low self-esteem resulting from lack of social and economic opportunities and persistent poverty (109), tribal norms operating against achievement and success and against interference in another's personal life (11), acculturation pressures associated with economic development (110), and other factors have been posited as causes of self-inflicted injury in Indians.

Death rates in IHS service areas from conditions originating in the perinatal period (the period immediately around the time of birth) have declined since 1972, but they are still the 10th leading cause of death among Indians, compared to being the 12th leading cause of death for U.S. all races. The importance of these causes, and congenital anomalies, another leading cause of infant death, to Indian infant mortality in general is discussed below under "Infant mortality."

Table 4-12.—Mortality Rates for Pneumonia by Age U.S. All Races and Indians in IHS Areas (excluding California) 1980-82 and U.S. All Races 1981
(rate per 100,000 population)

Age group	IHS area Indians	U.S. all races	Ratio IHS area Indians to U.S. all races
<1	71.9	22.2	3.2
1 to 4	6.7	1.7	3.9
5 to 14	1.5	0.4	3.7
15 to 24	1.9	0.7	2.7
25 to 34	5.0	1.4	3.6
35 to 44	9.7	3.2	3.0
45 to 54	22.2	7.2	3.1
55 to 64	37.4	17.7	2.1
65 to 74	96.7	50.0	1.9
75 to 84	383.8	197.6	1.9
>85	1,566.6	787.6	2.0
Age-adjusted rate	25.6	13.9	1.8

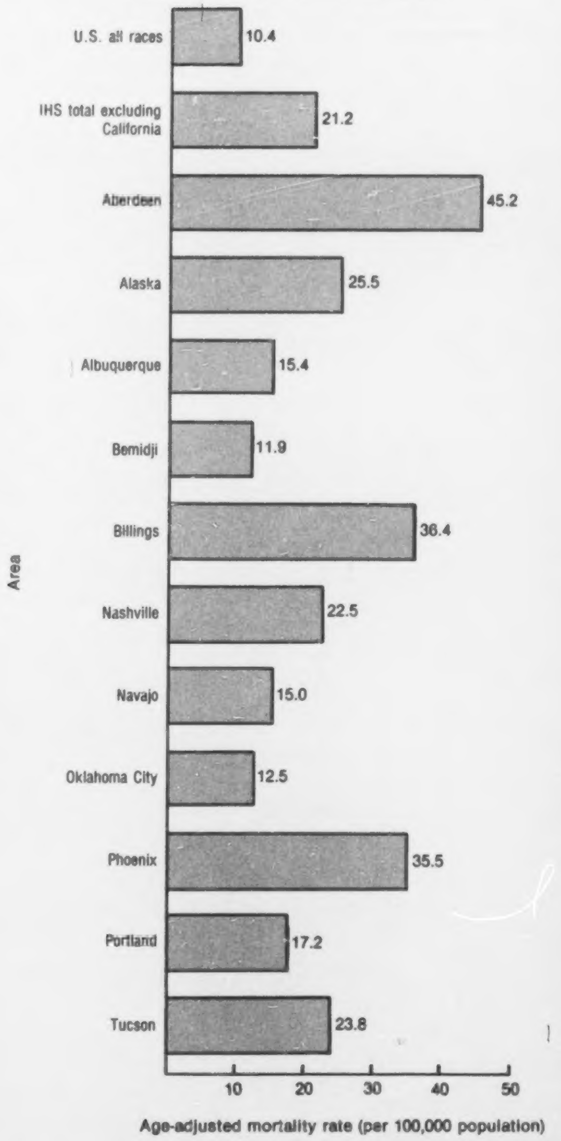
SOURCES: **Indian data:**U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **U.S. all races data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report of Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984.

As discussed above, diabetes is perceived to be a growing problem among Indians in almost all areas. Kidney failure is a common sequelae of diabetes, and IHS area Indian deaths from renal failure exceeded the U.S. all races rate by 2.8 (figure 4-13). The larger category of kidney problems (nephritis, nephrotic syndrome, and nephrosis) was the 11th leading cause of death for Indians in IHS areas in 1980 to 1982, showing an apparent 50 percent rise since the 3-year period centered in 1973.

Deaths due to chronic pulmonary diseases, the 13th leading cause of death among IHS service area Indians, were below the U.S. all races rate on average, although they exceeded the U.S. all races rate in three IHS areas: Aberdeen, Bemidji and Billings (figure 4-14).

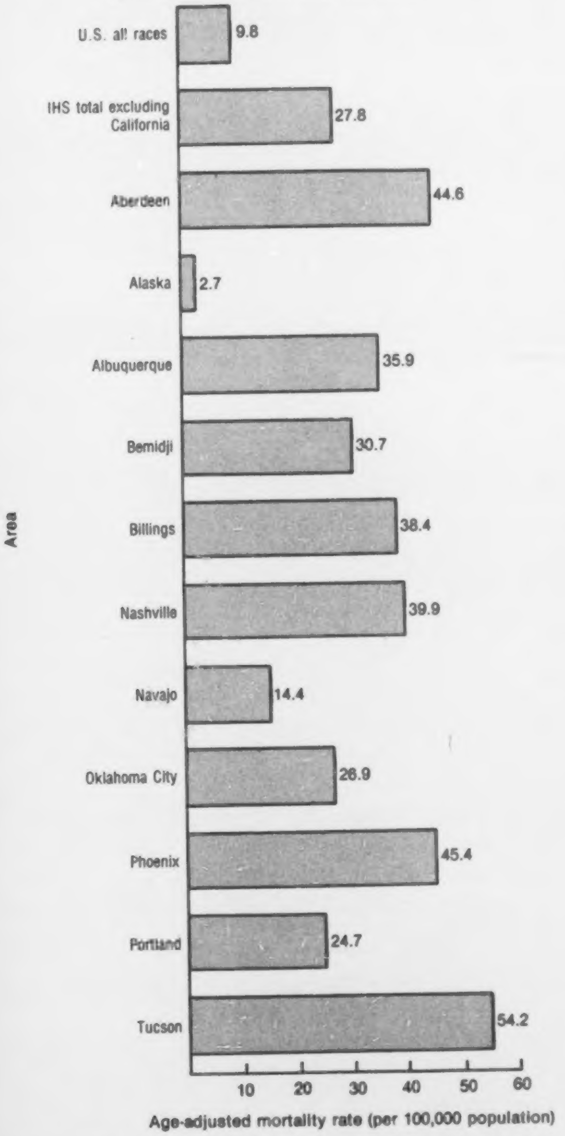
Mortality from septicemia (systemic infection) was the 14th leading cause of death among Indians, accounting for 122 deaths. Overall this rate was more than twice that of the U.S. all races rate; small numbers in individual areas make comparisons difficult.

Figure 4-10.—Age-Adjusted Death Rates for Diabetes Mellitus, American Indians in 11 IHS Areas (excluding California) 1980-82



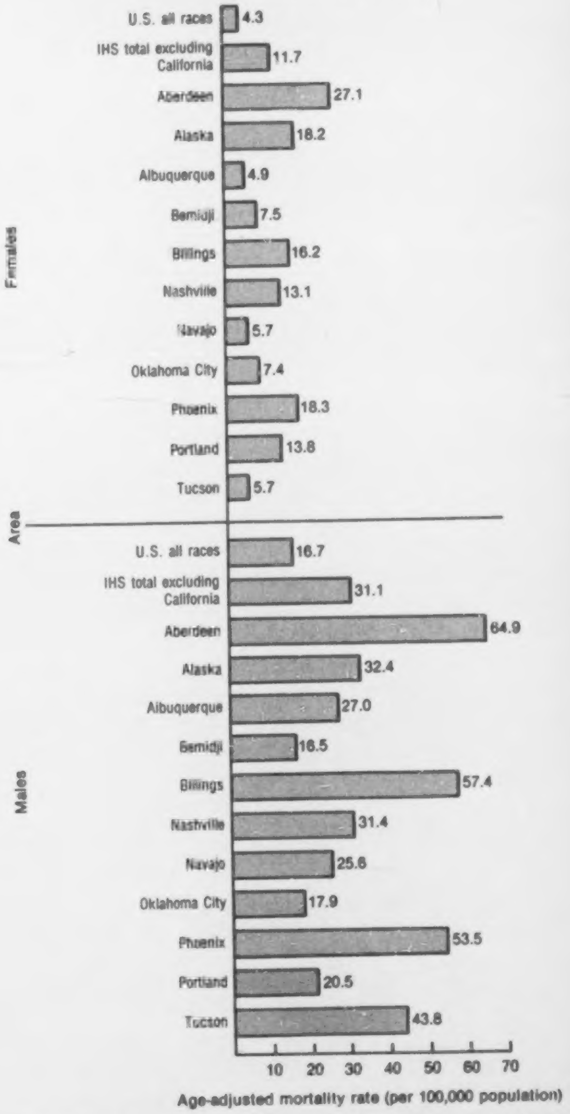
SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-11.—Age-Adjusted Death Rates for Homicide, American Indians in 11 IHS Areas (excluding California) 1980-82



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-12.—Age-Adjusted Death Rates for Homicide, American Indians Male and Female, in 11 IHS Areas (excluding California) 1980-82



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Table 4-13.—Suicides and Suicide Rates by Age Indians in IHS Areas 1980-82 and U.S. All Rates 1981 (rate per 100,000 population)

Age group	IHS		U.S. all races rate	Ratio IHS service areas to U.S. all
	Number	Rate		
0 to 4	—	—	—	—
5 to 14	4	0.78	0.5	1.5
15 to 24	218	39.2	12.3	3.2
25 to 34	136	37.3	16.3	2.3
35 to 44	57	23.7	15.9	1.5
45 to 54	25	14.0	16.1	0.9
55 to 64	12	8.9	16.4	0.5
65 to 74	7	8.9	16.2	0.5
75 to 84	1	2.9	18.6	0.2
>85	—	—	17.7	—

SOURCES: **Indian data:**U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **U.S. all races data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report of Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984.

The declining incidence of tuberculosis is among the most notable improvements in Indian health. In the early 1950s tuberculosis was the fourth leading cause of death among Indians across the United States, accounting for 8.1 percent of Indian deaths. In the 3-year period centered in 1981, tuberculosis was the 15th leading cause of Indian deaths, accounting for 0.5 percent of deaths. The age distribution of most deaths from tuberculosis also identifies it as a declining problem among Indians. A total of 77 Indians were identified as having died of tuberculosis in the 3-year period centered in 1981; almost 90 percent of them were age 45 or above.

Infant Mortality

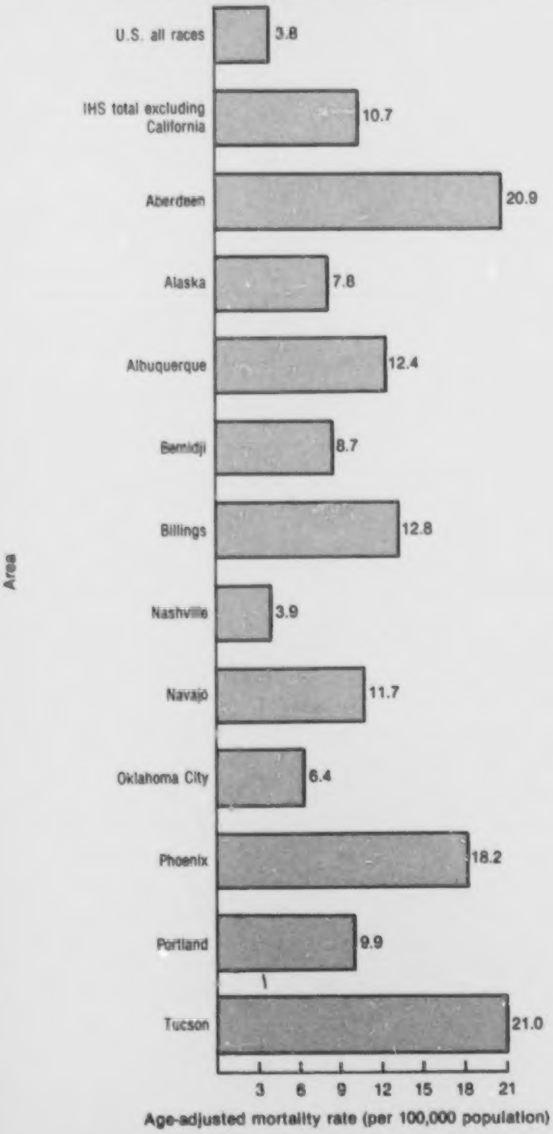
In the early 1950s, what were then called "diseases of early infancy" (now called certain conditions arising in the perinatal period) were the fifth leading cause of death among Indians and other U.S. populations alike, although these diseases accounted for a greater proportion of Indian deaths (7.1 percent) than U.S. all races deaths (4.3 percent). Congenital malformations (now called congenital anomalies) were the 9th leading cause of death among Indians in the early 1950s, and the 10th among U.S. all races. Since the early 1950s, infant mortality has declined significantly among all U.S. populations, but, reflecting the IHS emphasis on maternal and child health, at a greater rate among Indians (188,191). However, as with most other causes of death, infant mortality rates still exceed that of U.S. all races on average, a situation due primarily to the persistence of high mortality rates among postneonates (i.e., infants between 28 days and 1 year). Death rates of Indian postneonates exceeded that of U.S. all races in all areas but Oklahoma City (figure 4-15). Most of these deaths were attributed to sudden infant death syndrome, the cause of which is unknown, but which in general has been reported to occur among low birth weight infants born to young mothers who smoke (185). OTA was not able to investigate fully those relationships from available data. About one-quarter of Indian infants are born to females 19 or younger, compared to a rate of about 15 percent of births to U.S. all races teenage females (175a,191). On average, the percent of low birth weight infants among Indians (6.1 percent in 1980 to 1982 (175a,191) is about equal to the percent for U.S. all races (6.3 percent in 1981), but this figure is considered high among industrialized nations. Most of these low birth weight infants are born to older Indian women, unlike the U.S. all races experience, in which a higher proportion of low birth weight infants are born to teenagers.

On average the death rate among Indian neonates (from 0 to 27 days old) was lower than that of U.S. all races; only two areas (Aberdeen and Alaska) exceeded the U.S. all races rate (figure 4-15).

Indians in Urban Areas

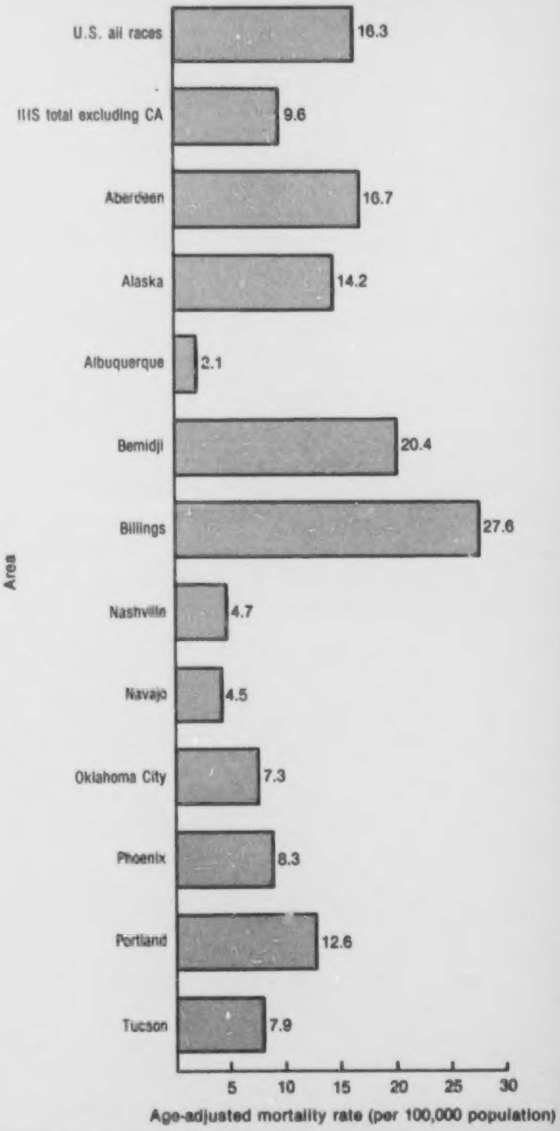
There is very little information on the health status of urban Indians, despite the fact that they

Figure 4-13.—Age-Adjusted Death Rates for Renal Failure American Indians Both Sexes, in 11 IHS Areas (excluding California) 1980-82



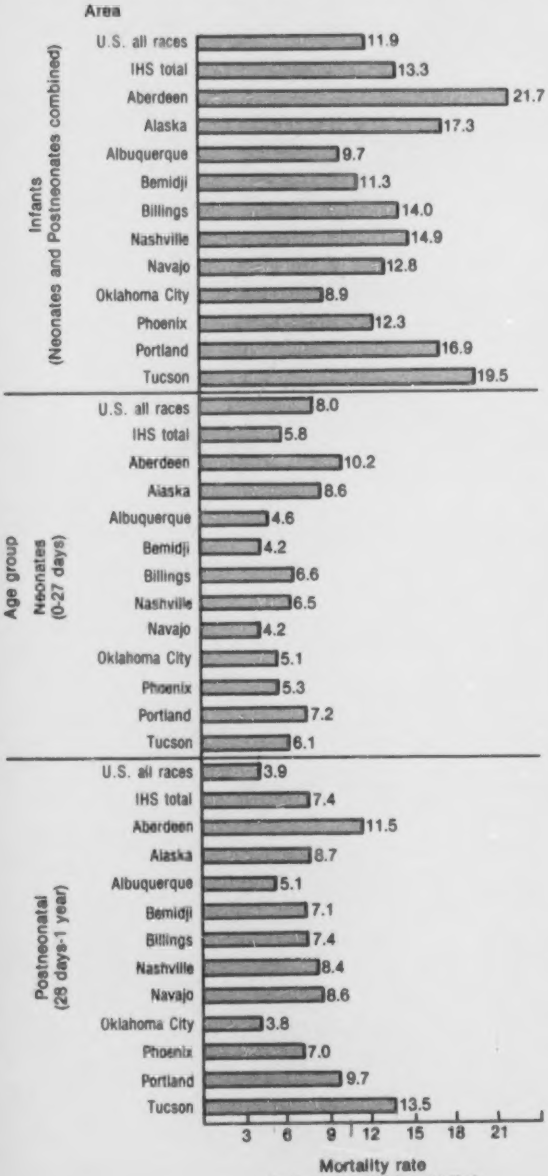
SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-14.—Age-Adjusted Death Rates for Chronic Pulmonary Diseases American Indians Both Sexes, in 11 IHS Areas (excluding California) 1980-82



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Figure 4-15.—Infant Mortality Rates: American Indians in IHS Areas 1980-82 and U.S. All Races, 1981



SOURCES: **Indian data:** U.S. Department of Health and Human Services, Public Health Service, Health Resource and Services Administration, Indian Health Service, Computer tape supplied to the OTA, 1985. **U.S. All Races data:** U.S. Department of Health and Human Services, Public Health Service, Health Resource and Services Administration, Indian Health Service, *Chart Series*, 1985.

are estimated to constitute about 50 percent of the total Indian population. IHS does not collect diagnostic patient care information from urban programs, and does not analyze or publish vital statistics or population characteristics for urban Indians except when these data are included with national level data on the reservation States.

Vital statistics information on Indians residing in Standard Metropolitan Statistical Areas (SMSAs) was provided to OTA as part of 1980 to 1982 mortality information. Thus, OTA was able to generate some death rate information on urban Indians. However, because of the lack of age-specific population information, OTA was not able to generate age-adjusted rates; therefore the urban rates may only be comparable to crude rates for other Indians or to crude rates of particular urban areas; they are not comparable to U.S. all races age-adjusted rates, the standard of comparison generally used in this report. On average, however, Indians in SMSAs show essentially the same pattern of causes of death that is shown in IHS service areas. The leading causes of death were: 1) diseases of the heart; 2) accidents and adverse effects; particularly motor vehicle accidents; 3) cancer; 4) liver disease and cirrhosis; 5) cerebrovascular diseases; 6) homicide; 7) diabetes mellitus; 8) suicide; 9) pneumonia and influenza; and 10) conditions arising in the perinatal period. The existence of these and other problems similar to those of reservation Indians is supported by findings of studies by IHS (170), urban programs (5), and others (211).

Illness and Use of Services

There have been no large-scale epidemiological studies of overall Indian health. Therefore, conclusions about the prevalence and incidence of illness in IHS areas are subject to limitations of data on outpatient and inpatient care. These data must be used cautiously because they may be a more accurate reflection of the availability of services than the incidence and prevalence of illness. OTA found substantial differences between the use of medical services in IHS areas and what might be expected based on other sources of information, particularly patterns of mortality.

Use of Hospital Care and Patterns of Mortality

Given the poor health status reflected in Indian mortality statistics, it is striking that the overall 1984 hospital discharge rate in IHS areas (1,210 per 10,000 population) was lower than that in U.S. non-Federal short-stay hospitals (1,585 discharges per 10,000 population) (see table 4-14). In general, using data from U.S. non-Federal short-stay hospitals as a benchmark, IHS total hospitalization rates (excluding two tribally run hospitals) were lower than would be expected from mortality rates for accidents and violence, circulatory system diseases, malignant neoplasms, alcohol-related conditions, diabetes, and congenital anomalies. While Indian death rates from accidents, suicide, homicide, and other external causes substantially exceeded U.S. mortality rates in the 3-year period centered in 1981, the IHS hospitalization rates for injuries and poisonings in 1981 only slightly exceeded the U.S. rates.

Part of the reason for low hospitalization rates for certain diagnoses can be explained by the relative youth of the Indian population. For example, diseases of the circulatory system are the leading cause of hospitalization in U.S. non-Federal short-stay hospitals, but are the eighth leading cause of hospitalization in IHS direct and contract general hospitals (hospitals to which IHS service-eligible patients are sent when care is not available in IHS-run facilities). This can be partially explained by the fact that individuals age 65 and over account for 11.3 percent of the U.S. all races population and 60 percent of discharges for circulatory system diseases in U.S. non-Federal short-stay hospitals (203). In IHS hospitals, Indians 65 and over account for 5.3 percent of the IHS service population and 41 percent of such discharges.

But the relative youth of the Indian population cannot explain all the variation among health status indicators; the disparity between services provided and need is also apparent from a comparison of health care utilization and mortality rates by age. As shown in table 4-15, the ratio of IHS to U.S. non-Federal short-stay hospital inpatient discharges is lower than the ratio of Indian to U.S. all races mortality rates in all age groups 16 and above. Thus, there is a discrepancy between

Table 4-14.—Hospital Discharge Rates for Leading Causes: Indian Health Service Direct and Contract General Hospitals and U.S. Short-Stay Non-Federal Hospitals
(rates per 10,000 population)

Diagnostic category	Fiscal year 1984 Indian and Alaska native[a]	Calendar year 1984 U.S. all races in U.S. short-stay Non-Federal hospitals
Complications of pregnancy, childbirth, and puerperium	282	149
Normal deliveries	65	67
Injuries and poisonings	151	148
Respiratory system diseases	114	143
Digestive system diseases	112	184
Genitourinary system diseases	65	133
Supplementary conditions	64	117
Circulatory system diseases	63	239
Mental disorders	57	72
Symptoms, signs, and ill-defined conditions	57	22
Nervous system and sense organs diseases	50	71
All others	130	240
All categories	1,210	1,585

[a] Includes only those persons seen at IHS hospitals or paid for by IHS at contract hospitals; does not include tribal hospital workloads or hospitalizations not paid for by IHS.

SOURCES: **IHS data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Patient Care Statistics Staff, internal document, Rockville, MD, Feb. 11, 1985. **U.S. data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "1984 Summary: National Hospital Discharge Survey," *Advance Data from Vital and Health Statistics*, No. 112, DHHS Pub. No. (PHS) 85-1250 (Hyattsville, MD: PHS, Sept. 27, 1985), and unpublished data.

Table 4-15.—Age Distribution of Inpatient Discharges IHS Service Areas 1984 and U.S. All Races 1984 Compared to Age Distribution in the Population and Age-Specific Mortality Rates

	Percent distribution of inpatient discharges (by age group)			Percent in age group[a]			Ratio age-specific mortality rate Indians[b] to U.S. all races[d]
Age group	IHS 11 areas 1984	U.S. all races 1984	Ratio Indians to U.S. all races	Indians[c]	U.S. all races	Ratio Indians to U.S. all races	
All ages	100.0%	100.0%		100.0%	100.0%		
<15................	19.4	8.6	2.3	32.5	22.7	1.4	1.5
15 to 44	54.0	39.1	1.4	49.2	46.5	1.1	3.6
45 to 64	15.8	22.1	0.7	13.1	19.7	0.7	1.2
>65................	10.9	30.2	0.4	5.3	11.3	0.5	0.9

[a] As of 1980 U.S. Census.
[b] Three year period centered in 1981.
[c] Indians in reservation States; separate calculations are not made for service area Indians.
[d] Calendar year 1981.

SOURCES: **IHS inpatient data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, Patient Care Statistics Staff, "Utilization of Indian Health Service and Contract Hospitals, Fiscal Year 1984," internal document, Rockville, MD, no date. **U.S. all races inpatient data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "1984 Summary: National Hospital Discharge Survey," *Advance Data from Vital and Health Statistics*, No. 112, DHHS Pub. No. (PHS) 85-1250 (Hyattsville, MD: PHS, Sept. 27, 1985). **Age group data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Indian Health Service Chart Series Book April 1985* (Rockville, MD: IHS, 1985).

apparent need and the use of health care. Inconsistencies can more accurately be traced to variations in services available to Indians. The Portland area, for example, has no IHS hospitals and must purchase hospital care through the contract care program, and contract care has been limited in the past years to emergency and urgent cases. In the Portland area, the number of hospital discharges in 1984 (176 discharges) was almost identical to the number in 1979 (166 discharges), despite a 50-percent increase in the service population. As a result, the Portland area hospital discharge rate for most of the diagnostic categories was below what would have been expected from mortality data. The Bemidji and Nashville program areas also follow this pattern. The considerable variation in hospital discharge rates by cause among IHS areas is shown in table 4-16.

Outpatient Care

Data generated from IHS outpatient clinics can serve as a general guide to Indian health problems, subject to limitations discussed earlier. Leading diagnostic indicators are consistent with medical literature, reports from Indians, and other data (e.g., birth rates). Otitis media is a common reason for seeking outpatient care, as is diabetes, injuries, and well child and prenatal care (see tables 4-17 and 4-18). As discussed above, comparisons with U.S. all races figures are difficult to make because of differences between IHS's and NCHS's coding procedures. Other ailments affecting Indians in individual areas are discussed below. While Indians' use of outpatient services is high, it does not appear to be as great as the need when compared with mortality rates by age (tables 4-19 and 4-20).

Dental Needs

An IHS survey of its dental patients in 1983 to 1984 found that differences between Indian and U.S. all races dental health were "staggering" (47,160,176). For example, 81 percent of IHS's 5 to 19 year old dental patients had caries (cavities) compared to 63 percent of 5 to 17 year olds in a national survey. Based on its patient experience, IHS's dental program estimates that 60 percent of IHS's service population require an average of 11.8 "units" of dental care (e.g., examination, periodontal care, extraction) each. In 1984, this amounted to a total of 6,632,558 units of care required, but only about 30 percent of these units were able to be provided by IHS direct and contract dental staff leaving a 70 percent deficiency (180). OTA's calculations for individual areas indicate a range of deficiencies, to as high as an 80 percent unmet need for dental services in the Tucson service area (table 4-21).

Mental Health Needs

Utilization of mental health (and alcoholism) care is perhaps most dissonant with the estimated

Table 4-16.—Estimated Hospital Discharge Rates, U.S. Non-Federal Short-Stay Hospitals, Calendar Year 1984 and IHS Hospitals[a] Federal Fiscal Year 1984 in Order by U.S. Hospital Discharge Rate (rate per 10,000 population)

Principal diagnosis	ICD-9-CM code	U.S.	IHS	Aberdeen	Alaska[b]	Albuquerque	Bemidji	Billings	Nashville[c]	Navajo[d]	Oklahoma[e]	Phoenix	Portland	Tucson
Circulatory system disease	390-459	238.6	62.7	121.0	74.7	53.3	59.8	124.2	39.9	42.3	80.2	72.4	35.2	28.6
Complications of pregnancy, including normal	630-676	205.7[f]	347.0	407.0	354.9	252.3	70.9	341.8	90.8	390.9	348.7	343.3	86.8	183.2
Complications		138.5	220.0	324.0	260.4	58.0	50.9	218.1	52.7	326.0	293.7	287.4	51.2	146.8
Normal		67.2	65.0	83.0	94.7	194.3	19.1	123.7	38.1	64.9	55.0	55.9	35.6	36.4
Digestive system diseases	520-579	183.6	112.0	192.0	140.5	150.4	31.7	176.0	57.8	117.2	114.1	146.5	50.2	85.0
Alcoholic liver disease	571.0-571.3	1.6	4.4	5.9	1.9	7.0	0.9	12.5	0.3	2.8	3.6	12.0	1.3	9.0
Injuries and poisonings	800-999	148.1	150.6	297.0	243.2	161.5	63.0	283.2	57.8	142.8	74.6	286.7	62.8	115.4
Diseases of the respiratory system	460-519	143.5	114.0	252.0	155.9	115.6	54.0	197.5	71.7	100.3	71.9	200.1	50.3	95.8
Pneumonia	480-486	35.7	50.0	120.7	54.0	54.3	21.3	83.3	18.9	50.2	24.4	91.7	19.4	56.6
Asthma	493	19.8	13.5	21.9	15.0	11.9	11.0	21.7	10.2	9.2	13.8	31.5	4.4	4.5
Genitourinary system disease	580-629	132.9	65.4	114.0	79.3	67.6	18.9	103.5	37.7	59.7	70.4	115.7	23.9	26.9
Neoplasms	140-239	109.9	26.5	41.8	58.3	33.0	12.6	48.6	6.4	22.5	29.7	25.1	10.1	5.0
Malignant	140-208	87.8	18.6	31.0	44.1	24.6	10.8	38.9	5.8	15.6	18.1	16.9	6.1	4.5
Diseases of the muskuloskeletal system	710-739	101.3	32.8	48.0	79.8	34.6	14.4	65.8	13.7	21.4	22.0	54.2	18.6	24.1
Mental disorders	290-319	72.1	57.0	177.0	96.6	104.5	23.6	118.2	45.4	38.3	27.0	59.0	17.5	38.1
Alcohol dependence syndrome	303	16.7	23.3	101.3	45.0	43.3	9.1	46.9	10.2	4.3	9.8	20.0	6.4	9.5
Alcoholic psychoses	291	2.3	10.1	16.0	8.9	34.0	5.1	21.4	5.4	9.4	5.3	15.2	1.5	5.6
Nondependent alcohol abuse	305.0	3.4	3.4	7.0	7.0	3.7	1.9	9.7	—	1.4	1.8	4.0	2.8	6.7
Diseases of the nervous system and sense organs	320-389	71.2	50.0	79.1	121.9	41.2	11.5	78.5	22.1	55.2	29.4	79.2	17.2	19.0
Otitis media	381.0-381.4, 382	12.8	18.0	31.0	63.9	10.5	3.6	29.9	5.1	16.7	10.8	23.6	4.6	7.8
Endocrine, nutrition, metabolic diseases	240-279	48.6	37.3	79.0	21.0	53.1	26.2	69.3	31.5	25.6	34.6	64.9	14.6	61.6
Diabetes mellitus	250	25.3	26.2	60.0	9.2	30.9	20.6	54.1	14.7	16.5	23.5	49.4	9.0	53.2
Infectious and parasitic diseases	001-139	28.1	31.8	49.0	31.8	30.1	8.7	44.6	16.2	28.8	22.8	87.0	10.9	50.4
Tuberculosis, all forms	010-018	10.6	2.4	6.8	4.0	1.8	0.0	3.7	0.3	2.6	1.4	4.0	0.1	2.8
Diseases of the skin and subcutaneous tissue	680-709	24.2	29.6	68.4	33.8	35.3	11.7	47.4	23.4	25.2	19.8	58.0	8.7	31.4
Cellulitis and abscesses, excluding digital	682	10.1	17.0	39.8	16.0	23.6	6.6	29.9	17.0	15.3	9.7	31.0	5.9	24.6
Symptoms, signs, and ill-defined conditions	780-799	22.2	57.0	110.0	75.0	74.2	33.6	99.7	56.1	40.6	55.9	90.9	16.8	47.1
Supplementary classification	V01-V82[g]	19.4[g]	64.5	105.0	73.8	128.5	51.9	91.5	82.4	67.7	39.8	96.5	4.7	71.7
Diseases of the blood and blood-forming organs	280-289	15.1	6.6	17.3	8.5	6.4	0.2	9.0	5.5	4.6	7.7	6.7	2.5	9.0
Congenital anomalies	740-759	13.5	8.4	10.6	15.2	11.2	2.3	11.5	1.1	11.8	6.5	13.6	1.7	2.8
Conditions arising in perinatal period	760-779	7.1	22.4	30.9	38.2	22.7	7.4	24.2	4.2	33.7	14.7	37.7	5.5	18.5
Short gestation, low birthweight disorders	765	2.3	5.2	4.7	24.6	1.7	1.1	6.2	1.3	10.9	2.7	6.4	1.2	1.7
All[h]		1,585.1	1,210.1	2,199.0	1,702.5	1,374.1	505.7	1,934.6	653.9	1,228.6	1,069.1	1,837.5	437.8	913.6

[a] Direct, contract general and, where noted, two tribally-run hospitals (Bristol Bay, Alaska area, and Choctaw, Nashville/USET program).

[b] Major diagnostic categories include discharges and service population for Bristol Bay "638" hospital and Bristol Bay Service Unit; subcategories do not. All rates exclude discharge data and estimated service population for Norton Sound "638" hospital and service unit.

[c] Major diagnostic categories include discharges for Choctaw "638" hospital and service population for Choctaw service unit.

[d] Rate excludes 578 discharges from Ganado, a tribally operated hospital, but does not exclude Ganado's service population. The 578 discharges constitute a small percentage of Navajo area hospitalizations (19,904 excluding Ganado).

[e] Excludes discharges from and service population for Claremore Hospital which is tribally operated.

[f] Includes "females with deliveries" (ICD-9-CM code V27), because IHS includes these discharges with "complications of pregnancy" instead of in the supplimentary classification as NCHS does (see note g).

[g] Excludes "females with deliveries" (ICD-9-CM code V27), the rate for which is included in "complications of pregnancy."

[h] Totals may not add due to rounding.

SOURCES: **U.S. data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, *Advance Data From Vital and Health Statistics*, No. 112, DHHS Pub. No. 85-1250 (Hyattsville, MD: PHS, Sept. 27, 1985). **IHS data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Utilization of Indian Health Service and Contract Hospitals Fiscal Year 1984," internal document, no date, and U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Patient Care Statistics Staff, "Hospital Discharge Rate for Leading Causes," internal document, Feb. 11, 1985.

Table 4-17.—Number of Outpatient Clinical Impressions, Males and Females: Indian Health Service Facilities, Fiscal Year 1984

Male		Female	
Condition	Number of clinical impressions	Condition	Number of clinical impressions
Upper respiratory infection, common cold	97,991	Prenatal care	155,270
Acute otitis media	63,697	Upper respiratory infection, common cold	134,881
Hypertensive disease	61,203	Diabetes mellitus	102,268
Diabetes mellitus	58,365	Hypertensive disease	75,277
Well child care	57,892	Acute otitis media	63,661
Laceration, open wound	42,437	Well child care	58,790
Physical examination	36,629	Tests only (lab, X-ray)	55,721
Refractive error	32,562	Refractive error	51,962

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Patient Care Statistics Staff, internal document, Rockville, MD, Feb. 15, 1985.

Table 4-18.—Number of Outpatient Clinical Impressions by Leading Diagnostic Categories Indian Health Service Facilities: 11 IHS Areas, Fiscal Year 1984

Diagnostic category	Number of clinical impressions	Percent of total
Supplementary classification[a]	756,960	20.6
Respiratory system diseases	473,983	12.9
Nervous system and sense organ diseases	457,282	12.4
Injuries and poisonings	245,526	6.7
Diseases of skin and subcutaneous tissue	215,625	5.9
Pregnancy, childbirth, and puerperium	207,734	5.7
Endocrine, nutritional, and metabolic disorders	202,037	5.5
Circulatory system diseases	199,044	5.4
Symptoms and ill-defined conditions	174,923	4.8
Musculoskeletal system diseases	172,424	4.7
All other	567,951	15.5
Total, all categories	3,673,489	100.0

[a] This category includes well child care, hospital and medical/surgical followup, physical examinations, tests (lab and X-ray), socio-economic and environmental problems, and "all other" clinical impressions.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Patient Care Statistics Staff, internal document, Rockville, MD, Feb. 13, 1985.

need for such services in the Indian population. The need for these services can be inferred from the high poverty and unemployment rates discussed in chapter 3, the high mortality rates from preventable or "social" (101) causes and the widely held view that mental health problems are epidemic among both reservation and urban Indians (121,124,211). Many problems of American Indians are related to continuing social and emotional stresses: alcohol abuse, accidents, suicide, homicide, teenage pregnancy, and child abuse and neglect (34). Even as social and emotional disturbances are resulting in higher death rates among Indians, the high death rate itself leads to additional mental health problems of grief (110). Despite this need, hospitalizations for mental disorders have been declining in the IHS system more rapidly than they have in U.S. non-Federal short-stay hospitals (see figure 4-16), and outpatient encounters for mental health problems were not among the leading reasons for IHS outpatient visits in 1984. Mental health services are generally regarded as relatively unavailable in IHS areas, and alcohol treatment and prevention programs are conceded to not meet the need for them among the IHS areas (19,76).

Summary

In summary, a global view across IHS areas indicates that although there have been substantial improvements, the health status of Indians continues to lag behind that of U.S. all races populations taken together. Considerable improvement has been achieved in neonatal health and reducing deaths from accidents, infectious diseases, and tuberculosis. The health of older infants and young children, and death from external causes (accidents, homicide, suicide), alcoholism, pneumonia, and diabetes, remain significant problems. Health status in individual IHS areas is discussed in the following section.

Table 4-19.—Age Distribution of Outpatient Care IHS Service Areas 1984 and U.S. All Races 1981 Compared to Age Distribution in the Population and Age-Specific Mortality Rates

	Percent distribution of outpatient visits (by age group)			Percent in age group[a]			
Age group	IHS 11 areas 1984	U.S. all races 1981	Ratio Indians to U.S. all races	Indians[c]	U.S. all races	Ratio Indians to U.S. all races	Ratio age-specific mortality rate Indians[b] to U.S. all races[d]
All ages	100.0%	100.0%		100.0%	100.0%		
<15	31.2	18.3	1.7	32.5	22.7	1.4	1.5
15 to 24	18.3	13.5	1.4	22.5	18.7	1.2	2.7
25 to 44	25.4	26.6	1.0	26.7	27.8	1.0	4.6
45 to 64	16.4	23.3	0.7	13.1	19.7	0.7	1.2
>65	8.4	18.4	0.5	5.3	11.3	0.5	0.9
Unknown	0.3	—	—	—	—	—	—

[a] As of 1980 U.S. Census.

[b] Three year period centered in 1981.

[c] Indians in reservation States; separate calculations are not made for service area Indians.

[d] Calendar year 1981.

SOURCES: **IHS outpatient data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "1981 Summary: National Ambulatory Medical Care Survey," *Advance Data from Vital and Health Statistics*, No. 88 (Hyattsville, MD: PHS, Mar. 16, 1983). **U.S. all races outpatient data:** U.S. Department [illegible] Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

Table 4-20.—Percent Distribution of Outpatient Visits by Patient Age Group and Area: Indian Health Service Facilities, Fiscal Year 1984

	Total		Age groups					
Area	Number	Percent	<1	1 to 15	15 to 24	25 to 44	45 to 64	>65
Aberdeen	410,354	100.0	6.1	27.2[a]	17.4	24.5[b]	16.8	8.0
Alaska	323,097	100.0	7.0	20.3[b]	19.5[a]	29.8[a]	15.5[b]	7.0[b]
Albuquerque	302,817	100.0	7.2	24.4	17.9	26.2[a]	15.0[b]	8.9
Bemidji	112,356	100.0	4.8[b]	23.6	15.4[b]	24.7	20.9[a]	10.7[a]
Billings	332,379	100.0	6.2	24.1	18.9	25.8	16.1	7.8
Nashville	73,059	100.0	5.6[b]	27.7[a]	16.3	24.2[b]	16.7	9.4[a]
Navajo	698,150	100.0	8.7[a]	26.2[a]	19.1[a]	25.1	14.0[b]	6.7[b]
Oklahoma	661,217	100.0	5.6[b]	22.6[b]	18.8	22.9[b]	18.2[a]	11.8[a]
Phoenix	445,770	100.0	8.4[a]	23.1	19.1[a]	25.9	16.4	6.7[b]
Portland	235,924	100.0	6.2	24.8	15.6[b]	25.7	18.1	9.4[a]
Tucson	78,366	100.0	8.7[a]	22.6[b]	15.0[b]	26.5[a]	19.0[a]	8.0
Total	3,673,489	100.0	7.0	24.2	18.3	25.4	16.4	8.4

[a] Area with one of highest three percentages within age group.

[b] Area with one of the lowest three percentages within age group.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation, and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984*, (Rockville, MD: IHS, no date).

Table 4-21.—Dental Services Required in 12 IHS Areas

Area	Population	Services required[a]	Services provided[b] IHS	Contract	Tribe (638)	Total	Number of services required but not provided[c]	Percent required but not provided
Aberdeen	70,648	500,188	104,490	17,706	25,555	147,751	352,437	70%
Alaska	71,329	505,009	103,249	23,481	67,093	193,823	311,186	62
Albuquerque	51,211	362,574	114,402	34,512	1,410	150,324	212,250	59
Bemidji	47,000	332,760	55,921	29,970	43,778	129,669	203,091	61
Billings	40,106	283,951	135,068	8,770	—	143,838	140,113	49
California	71,642	507,226	—	6,563	119,108	125,671	381,555	75
Nashville	35,822	253,620	33,843	12,956	42,380	89,179	164,441	65
Navajo	162,005	1,146,995	295,296	39,071	—	334,367	812,628	71
Oklahoma	190,451	1,348,393	267,704	42,597	11,874	322,175	1,026,218	76
Phoenix	82,309	582,748	136,430	8,769	2,327	149,853	432,895	74
Portland	96,427	682,703	89,448	50,075	15,477	155,000	527,703	77
Tucson	17,852	126,392	12,748	2,520	—	15,268	111,124	88
Area total	936,802	6,632,559	1,348,599	276,990	329,002	1,954,918	4,675,641	70%

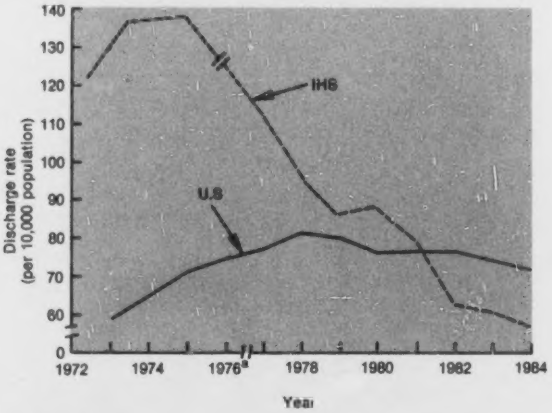
[a] Equal to 11.8 units required × 60 percent of service population (IHS, "Findings from an Oral Health Survey of Native Americans," internal document, Rockville, MD, Jan. 31, 1985).

[b] Does not include services provided in urban programs, some of which may have been provided to IHS service area population.

[c] Equal to total services provided subtracted from services required.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Dental Services Branch, internal documents, Rockville, MD, various dates, 1985.

Figure 4-16.—Hospitalizations for Mental Disorders IHS Direct and Contract Hospitals and U.S. Non-Federal Short-Stay Hospitals 1973-1984



[a] Missing data.

SOURCES: **1973-1983 IHS and 1974-1980 and 1982-83 U.S. data:** IHS, Patient Statistics Branch, Hospital discharge rates, internal documents, January 15, 1974-Feb. 6, 1984; **1984 IHS data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Office of Planning, Evaluation and Legislation, Program Statistics Branch, Patient Care Statistics Staff, *Utilization of Indian Health Service and Contract Hospitals, Fiscal Year 1984*, internal document, Rockville, MD: no date. **1981 U.S. data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Utilization of Short-Stay Hospitals: United States, 1981 Annual Summary," *Vital and Health Statistics*, Series 13, No. 72 DHHS Publication No. (PHS) 83-1733 (Hyattsville, MD: Public Health Service, August 1983). **1984 U.S. data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, *1984 Summary: National Hospital Discharge Survey, Advance Data from Vital and Health Statistics*, No. 112, DHHS Publication No. (PHS) 85-1250 (Hyattsville, MD: PHS, Sept. 27, 1985).

AREA-SPECIFIC FINDINGS

Aberdeen Area

Aberdeen is the seventh most populous of the IHS areas, with IHS estimating that the service population was 70,648 persons in 1984. Aberdeen includes the four reservation States of North Dakota, South Dakota, Nebraska, and Iowa, although most Indians in the Aberdeen area reside in North or South Dakota, States with great extremes of temperature, rough terrain, and few natural resources. Harsh living conditions and limited socioeconomic opportunities in the Aberdeen area contribute to the poor health of Indians.

Although death rates have declined in the Aberdeen area in the past decade, and the pattern of causes has changed somewhat (see table 4-22), Aberdeen continues to have the highest mortality rate of IHS areas. The age-adjusted mortality rate in Aberdeen for the 3-year period centered in 1981 (1,261.3 per 100,000 population) exceeded that of the U.S. all races population by more than 200 percent. The rate for females was 2.3 times that of U.S. all races females, and for males, 2.1 times that of U.S. all races males. Current hospitalization rates for Aberdeen (2,199.4 per 10,000 IHS eligible population (195)) also exceed those of U.S. all races (203), although there are diagnostic categories for which hospitalization rates are lower for the Aberdeen population.

For all but one of the 15 leading causes of death (malignant neoplasms among males), mortality rates were higher in the Aberdeen area than they were for the U.S. all races population (table 4-23). The 15 leading causes of death among Aberdeen females were diseases of the heart, malignant neoplasms, accidents, liver disease, cerebrovascular disease, diabetes, pneumonia, homicide, conditions arising in the perinatal period, nephritis and other diseases of the urinary tract, suicide, congenital anomalies, tuberculosis, septicemia, and "all other external causes." Among Aberdeen males, diseases of the heart were the leading cause of death, followed by accidents, malignant neoplasms, liver disease, suicide, homicide, pneumonia, conditions arising in the perinatal period, cerebrovascular disease, diabetes, "all other external causes," chronic pulmonary diseases, nephritis and other diseases of the urinary tract, congenital anomalies, and other diseases of the arteries, arterioles, and capillaries. Thus, what are

Table 4-22.—Changes in Crude Death Rates, 1972-82: IHS Aberdeen Area (rates per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
790	Accidents/adverse effects	252.3	231.7	158.4	−37.2
800	Motor vehicle	134.0	135.4	101.5	−24.2
810	All other accidents	118.3	96.2	56.9	−51.9
310	Diseases of the heart	218.9	211.4	192.8	−11.9
150	Malignant neoplasms	96.5	80.3	99.0	2.5
620	Liver disease/cirrhosis	67.3	71.1	61.0	−9.3
510	Pneumonia/influenza	64.6	55.2	39.0	−39.7
740	Conditions arising in perinatal period	50.3	47.8	31.8	−36.8
430	Cerebrovascular disease	42.8	41.0	36.4	−15.0
260	Diabetes mellitus	32.6	31.8	28.7	−11.9
830	Homicide	27.8	36.1	37.4	34.6
820	Suicide	23.1	28.1	32.8	42.0
	All other causes	247.8	275.5	174.6	−29.5
ALL	All causes	1,124.0	1,110.0	945.9	−15.8

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977,* DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Table 4-23.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Aberdeen IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Aberdeen area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
310	1.	Diseases of the heart	136	181.5	135.1	1.3
150	2.	Malignant neoplasms	100	149.3	108.6	1.4
790	3.	Accidents/adverse effects	97	108.0	20.4	5.3
620	4.	Liver disease/cirrhosis	56	86.3	7.4	11.7
430	5.	Cerebrovascular disease	39	48.9	35.4	1.4
260	6.	Diabetes mellitus	32	47.9	9.6	5.0
510	7.	Pneumonia/influenza	29	33.4	9.2	3.6
830	8.	Homicide	22	27.1	4.3	6.3
740	9.	Perinatal conditions	20	11.2	8.2	1.4
640	10.	Nephritis, et al	17	25.5	3.6	7.1
820	11.	Suicide	10	11.5	5.7	2.0
730	12.	Congenital anomalies	9	5.6	5.5	1.0
030	13.	Tuberculosis	7	10.0	0.4	25.1
090	14.	Septicemia	7	8.5	2.4	3.5
840	15.	All other external causes	6	5.7	0.9	6.3
		All others	160	193.8	63.7	3.0
ALL	....	All causes	747	954.2	420.4	2.3
Males:						
310	1.	Diseases of the heart	240	414.7	271.2	1.5
790	2.	Accidents/adverse effects	212	263.4	60.2	4.4
150	3.	Malignant neoplasms	93	159.8	163.7	1.0
620	4.	Liver disease/cirrhosis	63	113.4	16.0	7.1
820	5.	Suicide	54	65.0	18.0	3.6
830	6.	Homicide	51	64.9	16.7	3.9
510	7.	Pneumonia/influenza	47	65.3	16.6	3.9
740	8.	Conditions arising in perinatal period	42	24.8	10.3	2.4
430	9.	Cerebrovascular disease	32	52.3	41.7	1.3
260	10.	Diabetes mellitus	24	41.4	10.0	4.1
840	11.	All other external causes	20	29.6	2.2	13.4
540	12.	Chronic pulmonary disease	18	29.9	26.2	1.1
670	13.	Renal failure, etc.	10	17.0	4.9	3.5
730	14.	Congenital anomalies	12	7.1	6.1	1.2
490	15.	Other artery diseases	9	14.8	8.5	1.7
		All others	171	249.6	81.0	3.1
ALL	....	All causes	1,098	1,613.0	753.3	2.1

SOURCES: **U.S. all races:** U.S. Department of Health and Human Resources, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

widely believed to be preventable causes of mortality predominate among both male and female Indians in Aberdeen.

Although deaths from diseases of the heart and the circulatory system are generally lower among Indians than among other U.S. populations, they are slightly higher among Aberdeen area Indians of both sexes than among the U.S. all races population, despite a 12-percent decline in the Aberdeen death rate from heart disease since the 1972 to 1973 period. When deaths from both sexes are combined, diseases of the heart are the leading cause of death among Aberdeen area Indians. In Aberdeen, diseases of the heart are not limited to older Indians. The Aberdeen Indian death rate from heart disease begins to exceed that of U.S. all races for the 15 to 24 year age bracket, and exceeds the U.S. rate for all subsequent age groups (table 4-24). Cerebrovascular disease is also a leading cause of death among Aberdeen Indians, occurring at 1.4 times the U.S. all races rate for females, and 1.3 times the U.S. all races rate for males. The Aberdeen area hospitalization rate for circulatory system diseases, however, is substantially lower than that in U.S. non-Federal short-stay hospitals. The low hospitalization rate cannot be explained fully by the relatively young Indian population, because younger Aberdeen area Indians have a high heart disease death rate. One-

Table 4-24.—Heart Disease Mortality by Age IHS Aberdeen Area Indians 1980-82 and U.S. All Races 1981 (rate per 100,000 population)

	Mortality rate		
Age group	IHS Aberdeen area Indians	U.S. all races	Ratio Aberdeen area Indians to U.S. all races
0 to 4	7.2	106.1	0.1
5 to 14	—	0.9	—
15 to 24	11.5	2.6	4.4
25 to 34	18.4	8.4	2.2
35 to 44	143.4	43.2	3.3
45 to 54	358.1	177.7	2.0
55 to 64	846.4	481.5	1.8
65 to 74	1,692.4	1,175.8	1.4
75 to 84	2,955.1	2,850.3	1.0
>85	7,265.0	7,459.0	1.0

SOURCES: **Indian data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **U.S. all races data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report of Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984.

third of female deaths and one-half of male deaths from heart disease in Aberdeen area Indians are caused by acute myocardial infarction, indicating that medical care is often not obtained in time to save the victim.

Although the Aberdeen area death rate from accidents has declined almost 40 percent since the early 1970s, accidents, particularly motor vehicle accidents, remain the leading cause of death for Aberdeen males. Furthermore, the death rate from accidents for female Indians in Aberdeen far exceeds that of U.S. all races females, and Aberdeen, with Alaska, has the second highest (after the Billings area) accidental death rate for females of all IHS areas. Deaths from causes other than motor vehicle accidents account for most of the decline in mortality since the early 1970s.

Aberdeen has the second highest rate of suicide among IHS areas for both males and females. Furthermore, the Aberdeen suicide rate increased 42 percent in the decade for which data are available. Age-specific information is not available for earlier periods, but as shown in table 4-25, compared to other U.S. populations in 1980 to 1982, suicide in Aberdeen was a problem of younger Indians. As in the United States generally, there were more suicides among men (160). Although the Aberdeen female rate was much lower than that for Aberdeen males, it was still double that of U.S. all races and U.S. white females (201).

Table 4-25.—Suicide Mortality by Age IHS Aberdeen Area Indians 1980-82 and U.S. All Races 1981 (rate per 100,000 population)

	Mortality rate		
Age group	IHS Aberdeen area Indians	U.S. all races	Ratio Aberdeen area Indians to U.S. all races
0 to 4	—	—	—
5 to 14	2.0	0.5	4.0
15 to 24	59.6	12.3	4.8
25 to 34	80.9	16.3	5.0
35 to 44	53.8	15.9	3.4
45 to 54	53.8	16.1	3.3
55 to 64	22.0	16.4	1.3
65 to 74	—	16.2	—
75 to 84	—	18.6	—
>85	—	17.7	—

SOURCES: **Indian data:**U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **U.S. all races data:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report of Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984.

In addition to having substantial numbers of deaths due to accidents and suicides, the Aberdeen area had the highest rate of deaths by homicide of all IHS areas for both males and females. In 1980 to 1982, deaths by homicide among Aberdeen men exceeded that of U.S. all races men by a ratio of 3.9; for women the comparable ratio was even greater, 6.3. As it has for suicide, the homicide rate increased by one-third between 1972 and 1982.

Deaths due to "all other external causes" (e.g., substance abuse, injury by firearms) were also high in the Aberdeen area, particularly for males. These were the 11th leading cause of death in Aberdeen, compared to being the 15th leading cause of death for both sexes for all IHS areas.

Violence contributes substantially to illness and injury as well. Injuries and poisonings were the second leading reason for hospitalization in the Aberdeen area. At a rate of 297.0 per 10,000 population, it was almost twice that of patients of all races in U.S. non-Federal short-stay hospitals. The serious nature of many of the injuries in Aberdeen is reflected in the greater proportion of patients sent outside of the IHS direct system for contract care: in 1984, 17.6 percent of inpatient treatment for injuries and poisonings was handled by Aberdeen contract general hospitals, compared to 15.1 percent for all IHS areas (201). Furthermore, almost 8 percent of outpatient visits by males (12,816 visits) in fiscal year 1984 were for lacerations and open wounds; dislocations, sprains and strains; and superficial injuries and contusions (table 4-26).

Cancer is the third leading cause of death in the Aberdeen area. (As for the general U.S. population, the cancer mortality rate for Indians in the Aberdeen area remained about level during the 1972-82 period.) Cancer mortality in Aberdeen area Indians differs somewhat by sex. For Indian women the mortality rate from all malignant neoplasms exceeded the rate for U.S. all races females by a ratio of 1.4. While the overall cancer death rate for Indian men in Aberdeen (159.8 per 100,000 population) exceeded that of other IHS areas on average (98.5 per 100,000 population), it was slightly below the rate for U.S. all races men (163.7). However, the age-adjusted rate for Aberdeen males exceeded that of U.S. all races men for cancers of the digestive system (1.8 ratio). Aberdeen cancer deaths also differ from those of U.S. all races in that rates were generally higher in both the youngest age group (0 to 4 years) and the age groups after 34 years of age, although age-specific differences varied somewhat by cause.

The rate of hospital discharges for malignant neoplasms among Aberdeen Indians was about

Table 4-26.—Fifteen Most Frequent Outpatient Diagnoses:[a] Aberdeen Area, Fiscal Year 1984

Rank	Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	300	Upper respiratory infection, common cold	17,855	7.3
2.	080	Diabetes mellitus	15,992	6.6
3.	819	Other preventive health services	13,770	5.6
4.	480	Prenatal care	12,447	5.1
5.	250	Acute otitis media	8,162	3.3
6.	283	Hypertensive disease	7,842	3.2
7.	818	Well-child care	6,472	2.7
8.	301	Pharyngitis and tonsillitis (non-strep)	6,102	2.5
9.	812	Other ill-defined, undiagnosed diseases	5,225	2.1
10.	400	Urinary tract infection	4,811	2.0
11.	510	Eczema, urticaria or skin allergy	4,715	1.9
12.	823	Tests only (laboratory and X-ray)	4,669	1.9
13.	575	Other muskuloskeletal, connective tissue disease	4,225	1.7
14.	821	Physical examination	4,053	1.7
15.	827	All other	4,915	1.9
Male:				
1.	300	Upper respiratory infection, common cold	12,290	7.6
2.	819	Other preventive health services	8,974	5.6
3.	250	Acute otitis media	7,842	4.9
4.	080	Diabetes mellitus	7,736	4.8
5.	283	Hypertensive disease	6,761	4.2
6.	818	Well-child care	6,363	4.0
7.	730	Laceration, open wound	5,630	3.5
8.	301	Pharyngitis and tonsillitis (non-strep)	4,276	2.7
9.	821	Physical examination	4,161	2.6
10.	702	Dislocations, sprains, and strains	3,760	2.3
11.	731	Superficial injury or contusion	3,426	2.1
12.	812	Other ill-defined, undiagnosed diseases	3,171	2.0
13.	575	Other musculoskeletal, connective tissue diseases	2,993	1.9
14.	820	Hospital medical/surgical followup	2,951	1.8
15.	510	Eczema, urticaria, or skin allergy	2,837	1.8
		All other causes, both sexes	205,928	
	ALL	All causes, both sexes	410,354	100.0

[a] The IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1986. **Aberdeen total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

one-third that of U.S. all races in non-Federal short-stay hospitals (see table 4-19). Cancer was also not among the 15 leading reasons for Aberdeen outpatient visits. These findings again indicate that medical care for cancer is relatively deficient.

The extent of the diabetes problem in Aberdeen is difficult to deduce from available mortality and morbidity information. Although it is still above the national rate, the diabetes death rate in Aberdeen has declined over time and has decreased in importance as a leading cause of death. Diabetes was the 10th leading cause of death in 1980 to 1982, compared to its being the 8th leading cause of deaths in 1972 to 1974 and the 9th leading cause in 1975 to 1977. However, the diabetes death rates in Aberdeen still exceeded the U.S. all races rate for females by 5:1 and for males by 4:1, although the absolute number of deaths attributed to diabetes in Aberdeen was small. However, the death rate from renal failure increased, exceeding the U.S. all races rates by 7.9 for females and 3.5 for males. A continuing problem with diabetes and its effects is reflected in the rate of health care utilization for diabetes. Hospital discharge rates in Aberdeen for diabetes was 60 per 10,000 population in 1984, compared to 25.3 per 10,000 population for U.S. all races. Diabetes was also a leading cause of outpatient visits for both male and female Aberdeen Indians, accounting for 4.8 percent (7,736) of male visits (fourth leading cause) and 6.6 percent (15,992) of female visits in 1984 (second leading cause). Based on the high rates of care for diabetes, it seems unusual that vision problems were not among the 15 leading causes of outpatient visits.

Pneumonia and upper respiratory system diseases were also significant problems in Aberdeen, with Aberdeen Indians dying and being hospitalized at rates more than three times that of U.S. all races populations with pneumonia. Chronic pulmonary disease was a less likely cause of death, but upper respiratory infections including the common cold, pharyngitis and tonsillitis, and acute otitis media predominated as causes of outpatient visits. Hospitalizations for otitis media were common in the Aberdeen area, which had the second highest rate of IHS areas, and exceeded the rate for U.S. non-Federal short-stay hospitals by more than 2:1.

In 1980 to 1982, Aberdeen's neonatal death rate exceeded that of U.S. all races by a ratio of 1.3. The postneonatal death rate for Aberdeen Indians was 11.4 per 1,000 live births, compared to 3.9 for U.S. all races, a ratio of 2.9. The leading cause of neonatal deaths was prematurity and/or low birth weight, and the leading cause of death for Aberdeen postneonates was sudden infant death syndrome, which occurred at a rate 1.8 times that of U.S. all races in 1981 (table 4-27).

The contribution of alcohol use to most causes of mortality and morbidity in the Aberdeen area cannot be quantified. However, chronic liver disease and cirrhosis, which is related to alcohol abuse, ranked fourth as a cause of death among Aberdeen Indians in 1980 to 1982, as it has since at least 1972. Aberdeen deaths from liver disease and cirrhosis were 8.7 times the U.S. all races rate for both sexes (11.7 for females and 7.1 times for males), although Aberdeen was not the highest of all IHS areas. Correspondingly, the Aberdeen area had a slightly higher rate of hospitalizations for alcoholic liver disease (5.9) than did IHS areas as a whole (4.4). Hospitalization for alcohol dependence syndrome in Aberdeen was 6.1 times the rate of U.S. non-Federal short-stay hospitals, which was the highest among IHS areas, but this was influenced by the fact that Aberdeen has one of only two psychiatric wards in the IHS system. (Aberdeen has 9 psychiatric beds and the IHS hospital in Gallup has 13.)

Aberdeen patient care statistics also indicate high rates of health care utilization for chronic infectious diseases and conditions. Hospitalizations for infectious and parasitic diseases were common among Aberdeen Indians relative to U.S. all races populations, as were outpatient visits for the skin diseases eczema and urticaria, urinary tract infections among women, and musculoskeletal and connective tissue disorders.

In summary, for almost all diseases and causes of death, Indians in the Aberdeen area were in poor health compared to other U.S. populations and to other Indians.

Table 4-27.—Infant Deaths and Death Rates IHS Aberdeen Area, 1980-82

IHS code[a]	Cause	Deaths			Rates (per 1,000 live births)		
		Total	Neonates	Postneonates	Total	Neonates	Postneonates
010	Intestinal infection	1	—	1	0.1	—	0.1
040	Septicemia	2	—	2	0.3	—	0.3
120	Blood diseases	1	—	1	0.1	—	0.1
130	Meningitis	2	—	2	0.3	—	0.3
140	Other nervous diseases	1	—	1	0.1	—	0.1
150	Acute upper respiratory infection	2	—	2	0.3	—	0.3
170	Pneumonia/influenza	8	—	8	1.1	—	1.1
180	Pneumonia	8	—	8	1.1	—	1.1
200	Other respiratory diseases	2	—	2	0.3	—	0.3
220	Gastritis, etc.	1	—	1	0.1	—	0.1
230	Other digestive	3	—	3	0.4	—	0.4
240	Congenital anomalies	17	10	7	2.3	1.3	0.9
380	Conditions arising in perinatal period	62	60	2	8.3	8.0	0.3
580	Symptoms/signs/other	47	5	42	6.3	0.7	5.6
590	SIDS	39	4	35	5.2	0.5	4.7
600	Symptoms/signs/other	8	1	7	1.1	0.1	0.9
610	Accidents/adverse effects	6	1	5	0.3	0.1	0.1
650	Homicide	1	—	1	0.1	—	0.1
680	All other causes	6	—	6	0.8	—	0.8
ALL	All	162	76	86	21.7	10.2	11.5

[a] IHS code, equivalence to ICD-9 Recode 61 for infant deaths available from IHS.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

Alaska Area

Eskimos, Aleuts, and Indians in the entire State of Alaska are served by the Alaska area, a population estimated to be 71,329 in 1984.

Alaska shows many of the same mortality patterns as do other Indian areas, particularly those in the Central and North Central Western continental States, but it is unusual in several aspects; notably, accidents, liver disease, cancers of the digestive system, and diabetes. Morbidity data are difficult to interpret, because information is not collected from one tribally administered hospital and a number of tribally administered health centers.

The Alaska overall crude mortality rate decreased an estimated 8.1 percent from 1972 to 1982. In 1980 to 1982 the age-adjusted mortality rate in Alaska exceeded that of U.S. all races by 1.6 (see table 4-28).

As for almost all IHS areas, the most common cause of death in Alaska was accidents. Alaska differs from most other IHS areas, however, in that accidents were the leading cause of death for females as well as males, and many of the deaths caused by accidents were not caused by motor vehicles. Accidents were responsible for 17 percent of female deaths in 1980 to 1982, at a rate 4.8 times that of U.S. all races females, and for almost a third of male deaths (299 of 957), at a rate 5.3 times that of U.S. all races males. While Alaska's mortality rate from accidents declined between 1972 and 1982 (see table 4-29), most of the change has been in the motor vehicle rate, and the overall decline has not been as great as it has for most other IHS areas.

As they are in almost all IHS areas, Alaska death rates from other forms of "social" mortality were higher than U.S. all races rates. Alaska is an interesting area to watch because of significant social and economic changes in the last several years. The mortality rate from homicides has fluctuated since 1972, resulting in a total increase of 19.4 percent compared to a U.S. average increase of 4 percent (142,143). By contrast, there has been an average decline for all IHS areas of 16.8 percent. The Alaska crude mortality rate from suicide declined between 1972 to 1982, as did that of IHS areas on average, while the U.S. crude rate remained stable (142,143). In 1980 to 1982, the age-adjusted homicide and suicide rates

Table 4-28.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Alaska IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Alaska area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
790	1.	Accidents/adverse effects	88	97.7	20.4	4.8
310	2.	Diseases of the heart	82	122.2	135.1	0.9
150	3.	Malignant neoplasms	67	99.9	108.6	0.9
430	4.	Cerebrovascular diseases	26	38.3	35.4	1.1
510	5.	Pneumonia/influenza	26	33.2	9.2	3.6
620	6.	Liver disease/cirrhosis	20	28.5	7.4	3.9
830	7.	Homicide	16	18.2	4.3	4.2
740	8.	Conditions arising in perinatal period	14	10.1	8.2	1.2
840	9.	All other external causes	9	7.6	0.9	8.5
030	10.	Tuberculosis	8	12.8	0.4	32.0
640	11.	Nephritis, et al	8	12.7	3.6	3.5
730	12.	Congenital anomalies	8	5.8	5.5	1.1
820	13.	Suicide	8	7.5	5.7	1.3
540	14.	Chronic pulmonary diseases	7	11.2	9.5	1.2
090	15.	Septicemia	5	7.0	2.4	2.9
		All others	116	149.1	63.8	55.8
ALL	....	All causes	508	661.8	420.4	1.6
Males:						
790	1.	Accidents/adverse effects	299	319.6	60.2	5.3
310	2.	Diseases of the heart	145	206.9	271.2	0.8
150	3.	Malifnant neoplasms	115	175.1	163.7	1.1
430	4.	Cerebrovascular disease	37	52.4	41.7	1.3
820	5.	Suicide	34	34.8	18.0	1.9
830	6.	Homicide	33	32.4	16.7	1.9
510	7.	Pneumonia/influenza	32	37.6	16.6	2.3
740	8.	Conditions arising in perinatal period	29	20.3	10.3	2.0
840	9.	All other external causes	27	29.5	2.2	13.4
620	10.	Liver disease/cirrhosis	17	25.8	16.0	1.6
540	11.	Chronic pulmonary disease	14	16.6	26.2	0.6
730	12.	Congenital anomalies	11	7.7	6.1	1.3
030	13.	Tuberculosis	5	7.3	1.0	7.3
140	14.	All other infectious/parasitic diseases	4	6.6	1.7	3.9
260	15.	Diabetes mellitus	4	5.3	10.0	0.5
		All others	151	212.0	91.6	44.2
ALL	....	All causes	957	1,164.4	753.3	1.5

[a] Equivalence to ICD-9 Codes availabel from IHS.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Resources, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

for Alaska males were both 1.9 times that of U.S. all races males, making suicide and homicide the fifth and sixth leading causes of death for Alaska area males.

It is unusual for the rate of hospitalizations in an IHS area to exceed the rate for U.S. non-Federal short-stay hospitals (see discussion of other areas), but in fiscal year 1984 Alaska Natives were hospitalized for injuries and poisonings at a rate of 240 per 10,000 population, well above the U.S. all races average of 148.1 (203), and the IHS average of 151 per 10,000 population. The high rate of accidents and injuries among Alaska males also can be inferred from outpatient statistics. In fiscal year 1984, diagnoses related to violence (laceration, open wound; dislocations, sprains, and strains; fracture of an extremity) accounted for 7.4 percent, and 3 of the 15 leading causes, of male outpatient visits (see table 4-30).

Heart disease was the second leading cause of death in Alaska, but it did not exceed the U.S. all races rate for either male or female Alaska Na-

Table 4-29.—Changes in Crude Death Rates, 1972-82: IHS Alaska Area (rate per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
790	Accidents/adverse effects	231.6	220.6	196.1	−8.2
800	Motor vehicle accidents	30.6	45.6	26.4	−13.9
810	All other accidents	183.0	175.0	169.8	−7.2
310	Diseases of the heart	100.4	95.8	115.1	14.6
150	Malignant neoplasm	91.2	87.8	92.2	1.1
430	Cerebrovascular disease	39.1	29.0	31.9	−18.3
510	Pneumonia/influenza	38.5	34.7	29.4	−23.6
280	Diabetes mellitus			2.0	
740	Conditions arising in perinatal period	33.0	26.8	21.8	−34.0
820	Suicide	30.0	43.9	21.3	−29.0
830	Homicide	20.8	26.2	24.8	19.4
620	Liver disease/cirrhosis	16.5	27.3	18.8	13.6
730	Congenital anomalies	11.0	10.8	9.6	−12.5
	All other causes	194.9	187.4	179.5	−7.9
ALL	All causes	807.6	790.3	742.5	−8.1

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

tives. However, mortality from heart disease has increased since 1972, from a crude rate of 100.4 per 100,000 population to 115.1 in the 1980 to 1982 period, so it is a disease of increasing concern to Alaska Natives. The increased concern with heart disease and continuing concern with cerebrovascular disease are reflected in an increase in hospitalizations for circulatory system diseases, from 3.5 percent of all diagnoses in 1979 to 4.4 percent in 1984 (excluding Norton Sound), but the 1984 rate (74.7 per 10,000 population in 1984, excluding the Norton Sound service unit population from the denominator) was still far below the U.S. all races rate of 238.6 per 10,000 population.

Malignant neoplasms (cancers) were the third leading cause of death for Alaska Native males and females (67 females and 115 males in the 3-year period, 1980-82). Occurring at a rate about equal to that of U.S. all races males and females. The exception was cancers of the digestive system, for which the rate was about twice that of the U.S. all races rate, probably as a consequence of an epidemic of hepatitis resulting in hepatocellular cancer (1,160). A greater proportion of Alaska hospitalizations was accounted for by malignant neoplasms than in the IHS system on average (2.6 percent of discharges in Alaska v. 1.5 percent of discharges on average (195)), although the rate per 10,000 population for Alaska (44.1) was almost half that of U.S. non-Federal short-stay hospitals (203).

Respiratory system diseases are a significant problem for Alaska Natives. Pneumonia continues to be a leading cause of death for both male and female Alaska Natives, exceeding the U.S. all races rate by more than 2:1. The Alaska Native death rate from pneumonia and influenza did not decline as much as it did for Indians in other IHS service areas (a 23.6-percent decline in Alaska v. a 42.6-percent decline on average). In 1984 upper respiratory infections accounted for 8.7 percent of outpatient visits among males and 3.6 percent among females. Otitis media alone accounted for another 8.8 percent of male, and 5.4 percent of female, outpatient visits, making it the leading cause of outpatient visits for males, and the third leading cause of outpatient visits for females. Alaska's hospitalization rate for otitis media was five times the rate of U.S. non-Federal short-stay hospitals.

Alaska's high infant mortality rate of 17.3 deaths per 1,000 live births was due primarily to high postneonatal mortality. As in all other IHS

Table 4-30.—Fifteen Most Frequent Outpatient Diagnoses: Alaska Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	480	Prenatal care	16,626	8.8
2.	251	Chronic otitis media with or without mastoiditis	10,235	5.4
3.	820	Hospital medical/surgical followup	7,539	4.0
4.	300	Upper respiratory infection, common cold	6,697	3.6
5.	819	Other preventive health services	5,590	3.0
6.	283	Hypertensive disease	4,510	2.4
7.	301	Pharyngitis and tonsillitis (nonstrep)	4,105	2.2
8.	823	Tests only (lab, X-ray)	4,094	2.2
9.	450	Infection of female genitalia (excluding VD)	3,839	2.0
10.	210	Refractive error	3,618	1.9
11.	821	Physical examination	3,507	1.9
12.	400	Urinary tract infection	3,473	1.8
13.	818	Well child care	3,369	1.8
14.	810	All other symptoms	5,037	2.7
15.	827	All other	10,507	5.6
Male:				
1.	251	Chronic otitis media with or without mastoiditis	10,215	8.8
2.	820	Hospital medical/surgical followup	5,052	4.3
3.	300	Upper respiratory infection, common cold	4,918	4.2
4.	730	Laceration or open wound	3,962	3.4
5.	818	Well child care	3,516	3.0
6.	821	Physical examination	2,871	2.5
7.	283	Hypertensive disease	2,756	2.4
8.	301	Pharyngitis and tonsillitis (nonstrep)	2,645	2.3
9.	310	All other respiratory diseases	2,543	2.2
10.	702	Dislocations, sprains, and strains	2,480	2.1
11.	819	Other preventive health services	2,370	2.0
12.	823	tests only (lab, X-ray)	2,315	2.0
13.	701	Fracture of extremtiy	2,255	1.9
14.	810	All other symptoms	3,480	3.0
15.	827	All other	6,467	8.8
		All other causes, both sexes	172,506	
	ALL	All causes, both sexes	323,097	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Alaska total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

areas, sudden infant death syndrome contributed most to the postneonatal death rate, but pneumonia was also a leading cause of death for Alaska infants, particularly postneonates (see table 4-31). Some Alaska area hospitalizations for causes related to infant mortality have declined in the recent past, but they were still high relative to rates for U.S. all races. In 1979, the Alaska discharge rate for congenital anomalies was 18 per 10,000 population. In 1984 it was 15.2 per 10,000 population, compared to a U.S. non-Federal short-stay hospital discharge rate of 13.5. For conditions arising in the perinatal period, the 1979 hospital discharge rate in Alaska was 14.1 per 10,000 population; in 1984 the Alaska rate (excluding Norton Sound) was a striking 38.2, 5.4 times the U.S. all races rate of 7.1, although this high hospitalization rate was at least partially due to a need to hospitalize because of hazardous weather, road, and flight conditions. (The overall rate of hospitalizations and the average length of stay are higher for Alaska IHS direct and contract facilities than for both the IHS and the U.S. average.) Alaska ranks second among IHS areas in the number of visits for prenatal care.

The Alaska area is unusual in that it has a very low diabetes mortality rate, only four Indians (males) having died from this disease in the 1980-82 period. Similarly, diabetes was not among the

Table 4-31.—Infant Deaths and Death Rates IHS Alaska Area, 1980-82

IHS code[a]	Cause	Deaths			Rates (per 1,000 live births)		
		Total	Neonates	Postneonates	Total	Neonates	Postneonates
040	Septicemia	1	—	1	0.1	—	0.1
050	Viral diseases	1	—	1	0.1	—	0.1
130	Meningitis	3	—	3	0.4	—	0.4
140	Other nervous diseases	4	—	4	0.6	—	0.6
160	Bronchitis	1	—	1	0.1	—	0.1
170	Pneumonia/influenza	8	1	7	1.2	0.1	1.0
180	Pneumonia	8	1	7	1.2	0.1	1.0
240	Congenital anomalies	17	13	4	2.5	1.9	0.6
380	Conditions arising in perinatal period	42	42	—	6.1	6.1	—
580	Symptoms/signs/other	29	1	28	4.2	0.1	4.1
590	SIDS	26	1	25	3.8	0.1	3.6
600	Symptoms/signs/other	3	—	3	0.4	—	0.4
610	Accidents	4	—	4	0.6	—	0.6
650	Homicide	2	—	2	0.3	—	0.3
680	All other causes	7	2	5	1.0	0.3	0.7
ALL	All	119	59	60	17.3	8.6	8.7

[a] IHS code, equivalence to ICD-9 recode 61 for infant deaths available from IHS.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

15 leading reasons for outpatient encounters in 1984. However, the increase in hospitalizations for diabetes from 5.9 per 10,000 population in 1979 (166) to approximately 9.2 per 10,000 in 1984 (excluding two tribally administered hospitals) may mean that diabetes is increasing as a problem, although this rate was still much lower than the IHS 1984 average hospitalization rate of 26.2.

Alcohol abuse is viewed as a problem in Alaska as elsewhere among Indian populations (64), but the death rate from liver disease and cirrhosis was surprisingly low, particularly among males. Complacency about the issue of alcohol use and abuse is not in order, however, as the death rate from liver disease and cirrhosis may be rising. There was an overall increase of 13.6 percent in deaths from liver disease and cirrhosis between 1972 and 1982, compared to a decline for IHS on average of 29.7 percent and a decline for U.S. all races of 20 percent (142,143,202).

Consistent with the lower death rate from liver disease and cirrhosis, the hospitalization rate for alcoholic liver disease in Alaska (1.9 per 10,000 population in 1984) was only slightly higher than that for U.S. short-stay non-Federal hospitals (1.6), and much lower than that of IHS hospitals on average (4.4 excluding all tribally administered hospitals). Comparisons among rates for alcohol-related conditions that are treated as mental disorders are less clear. In 1984, 55 Alaska Natives were hospitalized for alcoholic psychoses, which resulted in a rate (8.9 per 10,000 population) four times that of U.S. short-stay non-Federal hospitals, but less than the average IHS rate of 10.1 per 10,000 population. On the other hand, 1984 hospitalization rates for both alcohol-dependence syndrome and nondependent alcohol abuse were higher in Alaska than among either the U.S. all races or IHS population on average.

Hospitalizations for mental disorders were higher in Alaska (635 hospitalizations, including Bristol Bay, for a rate of 96.7 per 10,000 population) than in U.S. short-stay non-Federal hospitals (1.7 million hospital discharges, for a rate of 72.1 per 10,000 population).

In summary, the health status of Alaska Natives is both like and unlike other IHS areas. Based on mortality data, there have been substantial improvements since 1972 in cerebrovascular disease, pneumonia, suicide, and infant mortality, although death rates from these causes still exceeded those of the U.S. all races population. In the same period, Alaska Native death rates from heart disease, liver disease and cirrhosis, and homicide increased, while death rates from these causes declined throughout IHS on average. In particular, accidents, especially those not involving motor vehicles, pose a special problem for Alaska Natives, and deaths caused by accidents have not declined as much in Alaska as throughout IHS on average. Further, patient care data indicate that chronic otitis media is a severe problem among Alaska Natives, a problem undoubtedly contributed to by reduced access to medical care as a result of geographic isolation.

Albuquerque Area

The Albuquerque area serves about 40 percent of the Indian population in New Mexico and a very small percent of the Indian population in Colorado, for an estimated total service population of 51,329 Indians.

The Albuquerque area overall mortality rate for the 3-year period centered in 1981 was not one of the highest of the IHS areas, but mortality rates for both males and females nevertheless exceeded the U.S. all races rate. Among males, the 10 leading causes of death were accidents and adverse effects, heart disease, malignant neoplasms, suicide, liver disease and cirrhosis, pneumonia and influenza, cerebrovascular disease, homicide, nephritis, and, diabetes mellitus. For females, the 10 leading causes were accidents, heart disease, malignant neoplasms, diabetes mellitus, liver disease and cirrhosis, cerebrovascular disease, pneumonia and influenza, congenital anomalies, atherosclerosis, and suicide. The age-adjusted death rates and ratio to the U.S. all races are shown in table 4-32, but these figures should be interpreted cautiously because of small absolute numbers.

The Albuquerque death rate from accidents, particularly motor vehicle accidents, exceeded that of U.S. all races populations by 3.2 for both males and females, and was the leading cause of death for both sexes. Death from other violence-related causes also exceeded that of the U.S. all races population: the female suicide rate by 1.2, the male suicide rate by 3, and the male homicide rate by 1.6. As shown in table 4-33, substantial progress has been made in reducing the death rate from accidents and homicide, but the suicide death rate changed very little between 1972 and 1982. That this pattern of mortality may be continuing can be gathered from observing that injuries and poisonings were the second leading cause of hospital discharges in Albuquerque in 1984. However, the 1984 rate of hospitalizations for these external causes (161.5 per 10,000 population) was only slightly greater than the rates for both U.S. short-stay non-Federal hospitals (148.1) and IHS hospitals (151.0). Between 1979 and 1984, the Albuquerque rate of hospitalizations for injuries and poisonings declined slightly, but not as much as the U.S. all races rate.

As a further indication of the prevalence of violence and injury in Albuquerque, lacerations and open wounds were responsible for 3.2 percent of male outpatient visits to IHS facilities, making them the 10th leading cause of male visits. Hospitalizations for mental disorders were also unusually high in Albuquerque, although this was undoubtedly due in part to the availability of 13 psychiatric beds in the Gallup (New Mexico) service unit.

In general, death rates for cancer and cardiovascular diseases were lower among Albuquerque Indians than among the U.S. all races population, with the two exceptions of Albuquerque male mortality rates from genital cancer and intracerebral hemorrhage. Crude mortality rates for both diseases of the heart and malignant neoplasms declined between 1972 and 1982, the decline in cancer mortality being an exception to the patterns for the U.S. and IHS on average. As were the IHS rates on average, Albuquerque hospitalization rates in 1984 were substantially lower than comparable rates for U.S. all races for circulatory system diseases and malignant neoplasms.

The diabetes death rate was apparently not as high in Albuquerque as it was in other IHS areas, but the problem may be getting worse. The crude death rate from diabetes increased 26.6 percent between 1972 and 1982, although small numbers may make comparisons unreliable. Albuquerque's hospital discharge rate for diabetes in 1984 (30.9 per 10,000 population) exceeded that of IHS direct and contract hospitals on average (26.2), and of U.S. short-stay non-Federal hospitals (25.3). Further, diabetes accounted for 4.6 percent of male outpatient visits and 4.9 percent of female outpatient visits in Albuquerque in 1984, a substantial proportion of all outpatient encounters.

Table 4-32.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Alburquerque IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Albuquerque area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
790	1.	Accidents/adverse effects	43	65.7	20.4	3.2
310	2.	Diseases of the heart	32	57.6	135.1	0.4
150	3.	Malignant neoplasms	30	63.9	108.6	0.6
260	4.	Diabetes mellitus	19	44.7	9.6	4.7
620	5.	Liver disease/cirrhosis	17	35.3	7.4	4.8
430	6.	Cerebrovascular diseases	8	15.7	35.4	0.4
510	7.	Pneumonia/influenza	8	17.0	9.2	1.8
730	8.	Congenital anomalies	8	8.4	5.5	1.5
480	9.	Atherosclerosis	5	7.7	4.6	1.7
820	10.	Suicide	5	6.8	5.7	1.2
090	11.	Septicemia	4	9.5	2.4	3.9
830	12.	Homicide	4	4.9	4.3	1.1
740	13.	Conditions arising in perinatal period	3	2.6	8.2	0.3
140	14.	All other infectious/parasitic diseases	2	3.4	1.3	2.6
490	15.	Other arterial diseases	2	3.4	3.0	1.1
		All others	66	121.2	59.7	2.0
ALL	....	All causes	256	467.8	420.4	1.1
Males:						
790	1.	Accidents/adverse effects	109	189.9	60.2	3.2
310	2.	Diseases of the heart	49	104.8	271.2	0.4
150	3.	Malignant neoplasms	44	100.4	163.7	0.6
820	4.	Suicide	36	53.6	18.0	3.0
620	5.	Liver disease/cirrhosis	26	60.3	16.0	3.8
510	6.	Pneumonia/influenza	19	29.5	16.6	1.8
[illegible]30	7.	Cerebrovascular diseases	17	30.6	41.7	0.7
830	8.	Homicide	16	27.0	16.7	1.6
640	9.	Nephritis, et al	11	25.9	5.6	4.6
260	10.	Diabetes mellitus	10	26.1	10.0	2.6
740	11.	Conditions arising in perinatal period	8	7.0	10.3	0.7
730	12.	Congenital anomalies	6	7.4	6.1	1.2
840	13.	All other external conditions	5	12.5	2.2	5.7
090	14.	Septicemia	4	9.0	3.4	2.6
270	15.	Nutrition deficiencies	2	1.8	0.5	3.6
		All others	137	273.8	111.1	2.5
All	....	All causes	494	959.6	753.3	1.3

[a] Equivalence to ICD-9 codes available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

As in other IHS areas, postneonatal mortality in Albuquerque remains a significant health problem. In the 3-year period 1980-82, the total Albuquerque area infant mortality rate (9.7 per 1,000 live births), and the rate for neonates (4.6), were both lower than the rates for U.S. all races (11.9 and 8.0). The postneonatal rate of 5.1 was, however, 1.3 times that of the U.S. all races rate (3.9), and was accounted for mostly by sudden infant death syndrome (SIDS) (7 of the 38 infant deaths in 1980 to 1982). As throughout IHS, Indians in Albuquerque suffer from severe problems related to alcohol abuse. The relatively high infant death rate from congenital anomalies and the high morbidity and mortality rates from accidents, suicide, and diabetes are all consistent with an alcoholism problem in Albuquerque that is illustrated more directly by liver disease and cirrhosis death rates and hospitalizations for alcoholic liver disease, alcoholic psychoses, and other alcohol-related mental disorders. Most dramatic were the liver disease and cirrhosis death and hospitalization rates. In 1980 to 1982 Albuquerque mortality rates for alcoholic liver disease exceeded U.S. all races rates by 4.8 for females and 3.8 for males. Compared to a hospitalization rate for alcoholic liver disease

Table 4-33.—Changes in Crude Death Rates, 1972-82: IHS Albuquerque Area (rate per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
790	Accidents/adverse effects	166.2	140.0	106.2	−36.1
800	Motor vehicle accidents	119.1	96.3	65.7	−44.9
810	All other accidents	47.1	43.7	40.5	−14.0
310	Diseases of the heart	78.2	58.0	56.6	−27.6
620	Liver disease/cirrhosis	66.6	50.1	30.0	−54.9
150	Malignant neoplasms	61.3	53.3	51.7	−15.7
430	Cerebrovascular disease	35.5	24.6	17.5	−50.8
830	Homicide	28.4	15.1	14.0	−50.8
510	Pneumonia/influenza	27.5	25.4	18.9	−31.4
520	Pneumonia			18.9	
820	Suicide	26.6	31.0	28.7	7.7
260	Diabetes mellitus	16.0	16.7	20.3	26.6
740	Conditions arising in perinatal period	13.3	17.5	7.7	−42.2
630	All other causes	249.2	236.7	172.4	−30.8
ALL	All causes	769.8	668.4	524.0	−31.9

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

for U.S. all races of 1.6 per 10,000 population and an overall IHS rate of 4.4, the Albuquerque rate of 7.0 per 10,000 population was striking. Hospitalization rates for alcoholic psychoses, alcohol dependence syndrome, and nondependent alcohol abuse also exceeded U.S. and IHS rates on average.

Bemidji Area

In 1984, the Bemidji area served an estimated 47,000 Indians in the reservation States of Minnesota, Wisconsin, and Michigan. The small IHS service population and the relative lack of IHS facilities in the Bemidji area make the analysis of health status in Bemidji difficult. However, despite improvement over time, the health of Bemidji Indians apparently remains poor. In the 3-year period centered in 1973, the crude mortality rate for Bemidji was 879.9 per 100,000 population. In the 3-year period centered in 1981, it was 707.3, a 19.6-percent decline (table 4-34). Most of the decline was due to reductions in mortality from accidents, pneumonia and influenza, diabetes mellitus, cerebrovascular disease, and homicide, although declines in diseases of the heart and atherosclerosis contributed to overall improvement as well. However, there has been no improvement in the cancer mortality rate, and deaths from suicide and chronic liver disease and cirrhosis have increased. In the 3-year period centered in 1981, overall mortality of Bemidji Indians exceeded that of U.S. all races by 1.7.

The Bemidji area crude death rate from heart disease declined only 3.2 percent between 1972 to 1974. In 1980 to 1982, the age-adjusted death rate from diseases of the heart exceeded that of U.S. all races by 1.5 for males and almost 2 for females (table 4-35). Bemidji females had the worst, and Bemidji males the second worst, overall mortality rate from heart disease of all Indians in IHS service areas (see figure 4-14). Bemidji is unusual in that diseases of the heart rather than accidents are the leading cause of death among Indian males, and cerebrovascular disease rather than liver disease is the fourth leading cause of death among Indian males and females. IHS outpatient, but not inpatient, information indicates a severe problem with cardiovascular disease (see table 4-36). Hypertension, which is implicated in ischemic heart disease and cerebrovascular disease (100), accounted for 6.7 percent of male visits and 4.8 percent of female visits in 1984, making these the second and third reasons for outpatient

Table 4-34.—Changes in Crude Death Rates, 1972-82: IHS Bemidji Area (rate per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
310	Diseases of the heart	232.5	218.8	225.1	−3.2
790	Accidents/adverse effects	175.7	121.1	120.6	−31.4
800	Motor vehicle accidents	104.6	58.6	73.3	−30.0
810	All other accidents	71.0	62.5	47.3	−33.4
150	Malignant neoplasms	96.9	81.0	98.4	1.6
430	Cerebrovascular disease	69.7	74.2	39.7	−43.1
510	Pneumonia/influenza	60.7	29.3	20.6	−66.1
260	Diabetes mellitus	36.1	33.2	19.1	−47.1
620	Liver disease/cirrhosis	20.6	38.1	23.7	14.8
830	Homicide	18.0	23.4	11.5	−36.4
820	Suicide	14.2	24.4	19.1	34.4
480	Atherosclerosis	11.6	10.7	8.4	−27.7
	All other causes	143.9	141.0	121.1	−15.8
ALL	All causes	879.9	795.2	707.3	−19.6

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

visits respectively (see table 4-35). Only the Oklahoma City area (see below) had a higher percentage of IHS direct care encounters for hypertensive disease. However, the Bemidji area hospitalization rate of 54 per 10,000 population for circulatory system diseases was far lower than the U.S. short-stay hospital rate of 238.6 per 10,000 population, and was among the lowest of IHS areas (see table 4-19).

In the 3-year period centered in 1981, the age-adjusted cancer mortality rate of Bemidji females exceeded the U.S. all races female rate. The higher death rates for females were primarily from malignant neoplasms of the digestive and respiratory systems. The only cancer site for which Bemidji males had a greater death rate than U.S. all races males was the urinary tract. As have U.S. rates on the whole, the cancer death rate in Bemidji remained essentially unchanged between 1972 to 1974 and 1980 to 1982. Bemidji hospitalization rates for neoplasms have been surprisingly low, and average lengths of stay shorter than that in U.S. hospitals. The hospital discharge rate for malignant neoplasms in Bemidji was 10.7 per 10,000 population in 1979 (166), and 10.8 per 10,000 population in 1984. Comparable rates in U.S. non-Federal short-stay hospitals were 80.8 and 87.8 per 10,000 population. No cancer related diagnoses are among the leading causes of outpatient visits in Bemidji. (The low Bemidji rates could mean that fewer Indians than should be are treated for cancer, that coding for either or both the underlying cause of death and the first-listed diagnosis for hospital discharge are listed incorrectly, or that Indians are receiving treatment for cancer in non-IHS facilities.)

As in most IHS areas, in the 3-year period centered in 1981, accidents were the second leading cause of death among Bemidji males, and the third leading cause of death among Bemidji females, exceeding the U.S. all races rates by more than three times for both males and females. Deaths from violent causes other than accidents appear to be relatively less of a problem in Bemidji than in other IHS areas, the exception being male suicides, of which there were 22 in 1980 to 1982, a rate 1.7 times that of U.S. all races. Compared to other IHS areas, Bemidji was notable in that suicide was not among the 15 leading causes of death for Indian females in 1980 to 1982. Despite high accident and injury mortality rates, Bemidji's 1984 hospitalization rate per 10,000 population for injuries and poisonings (63.0) was markedly less than that of U.S. non-Federal short-stay hospitals (148.1). However, injury-related diagnoses (lacerations and open wounds; superficial inju-

Table 4-35.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Bemidji IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate Indians	Age-adjusted mortality rate U.S. all races	Ratio of Bemidji area Indians to U.S. all races
Females:						
310	1.	Diseases of the heart	125	262.5	135.1	1.9
150	2.	Malignant neoplasms	66	148.3	108.6	1.4
790	3.	Accidents/adverse effects	46	74.9	20.4	3.7
430	4.	Cerebrovascular diseases	21	36.6	35.4	1.0
620	5.	Liver disease/cirrhosis	16	36.6	7.4	4.9
260	6.	Diabetes mellitus	15	34.8	9.6	3.6
510	7.	Pneumonia/influenza	11	23.1	9.2	2.5
480	8.	Atherosclerosis	7	13.0	4.6	2.8
090	9.	Septicemia	6	10.4	2.4	4.3
540	10.	Chronic pulmonary diseases	5	9.3	9.5	1.0
830	11.	Homicide	5	7.5	4.3	1.7
640	12.	Nephritis, et al	4	8.9	3.6	2.5
610	13.	Hernia/intestinal obstruction	3	4.8	1.3	3.7
630	14.	Cholelithiasis/gallbladder	3	6.1	0.7	8.8
730	15.	Congenital anomalies	3	3.4	5.5	0.6
		All others	45	82.3	62.8	1.3
ALL	....	All causes	381	762.5	420.4	1.8
Males:						
310	1.	Disease of the heart	170	402.2	271.2	1.5
790	2.	Accidents/adverse effects	112	189.7	60.2	3.2
150	3.	Malignant neoplasms	63	153.2	163.7	0.9
430	4.	Cerebrovascular diseases	31	73.5	41.7	1.8
820	5.	Suicide	22	30.6	18.0	1.7
510	6.	Pneumonia/influenza	16	30.6	16.6	1.8
620	7.	Liver disease/cirrhosis	15	35.4	16.0	2.2
540	8.	Chronic pulmonary diseases	13	33.0	26.2	1.3
260	9.	Diabetes mellitus	10	26.2	10.0	2.6
830	10.	Homicide	10	16.5	16.7	1.0
740	11.	Conditions arising in perinatal period	9	10.2	10.3	1.0
730	12.	Congenital anomalies	7	7.9	6.1	1.3
640	13.	Nephritis, et al	5	10.8	5.6	1.9
480	14.	Atherosclerosis	4	9.4	6.0	1.6
490	15.	Other arterial diseases	4	10.3	8.5	1.2
		All others	55	102.6	76.5	1.3
ALL	....	All causes	546	1,142.1	753.3	1.5

[a] Equivalence to ICD-9 code available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

ries and contusions; dislocations, sprains, and strains) were among the 15 leading causes of outpatient visits for Bemidji males in 1984, accounting for 6.7 percent of male visits.

Other ailments of special note in Bemidji are reflected in morbidity but not mortality data: skin diseases, vision problems, disorders of the musculoskeletal system, and for females, urinary tract infections. Skin diseases constituted 2 of the 15 leading causes of male outpatient visits, and 1 of the 15 leading causes of female outpatient visits in 1984. As in almost all IHS areas, otitis media accounted for a high proportion of ambulatory care. Although there were few deaths from diabetes in 1980 to 1982 in Bemidji, it was a leading cause of outpatient visits in 1984, accounting for 6.8 and 7.2 percent of visits among females and males, respectively. Bemidji's hospitalization rate for diabetes (97 discharges 20.6 per 10,000 population in 1984) was lower than that of U.S. short-stay non-Federal hospitals (25.3) in 1984, but it was high relative to hospitalization rates for other diseases.

Table 4-36.—Fifteen Most Frequent Outpatient Diagnoses:[a] Bemidji Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	080	Diabetes mellitus	4,276	6.8
2.	819	Other preventive health services	4,123	6.5
3.	300	Upper respiratory infection, common cold	3,668	5.8
4.	283	Hypertensive disease	3,020	4.8
5.	250	Acute otitis media	2,776	4.4
6.	480	Prenatal care	2,651	4.2
7.	575	Other muskuloskeletal and connective tissue disease	1,794	2.8
8.	823	Tests only (lab, X-ray)	1,482	2.3
9.	210	Refractive error	1,473	2.3
10.	818	Well child care	1,362	2.2
11.	812	Other ill-defined, undiagnosed diseases	1,219	1.9
12.	400	Urinary tract infection	1,105	1.7
13.	510	Eczema, urticaria, or skin allergy	1,103	1.7
14.	301	Pharyngitis and tonsillitis (nonstrep)	1,093	1.7
15.	827	All other	1,143	1.8
Male:				
1.	080	Diabetes mellitus	3,481	7.2
2.	283	Hypertensive disease	3,237	6.7
3.	250	Acute otitis media	3,164	6.6
4.	300	Upper respiratory infection, common cold	2,638	5.5
5.	819	Other preventive health services	2,396	5.0
6.	818	Well child care	1,487	3.1
7.	730	Laceration, open wound	1,419	2.9
8.	575	Other muskuloskeletal and connective tissue disease	1,393	2.9
9.	210	Refractive error	1,116	2.3
10.	731	Superficial injury or contusion	939	2.0
11.	702	Dislocations, sprains, and strains	884	1.8
12.	520	Other diseases of skin	836	1.7
13.	355	Diseases of teeth and gums	833	1.7
14.	510	Eczema, urticaria, or skin allergy	824	1.7
15.	827	All other	836	1.7
		All other causes, both sexes	54,585	
	ALL	All causes, both sexes	112,356	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Bemidji total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

Billings Area

IHS estimates that its Billings area serves approximately 40,000 Indians residing in Montana and Wyoming.

The Billings service population is equal to 4.3 percent of the estimated IHS service population. However, in the 1980-82 period, Billings had 6.8 percent of IHS deaths. As in most other IHS areas, poor socioeconomic conditions in Billings correlate with poor health. The Billings area has shown only a 7-percent decline in overall mortality since the early 1970s, from a crude rate of 1,015.6 to 943.3 deaths per 100,000 population. The combined age-adjusted mortality rate for the Billings area in the 1980-82 period was 1,260, 1.3 deaths per 100,000 service population, a rate more than twice that of U.S. all races.

The leading causes of death among Indian males in 1980 to 1982 were accidents, heart disease, cancers, liver disease and cirrhosis, suicide, homicide, and cerebrovascular disease (see table 4-37). These causes accounted for 74 percent of all deaths. For females, the leading causes of death in 1980 to 1982 were heart disease, accidents, malignant neoplasms, liver disease and cirrhosis, diabetes mellitus, conditions originating in the perinatal period, cerebrovascular disease, pneu-

Table 4-37.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Billings IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Billings area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
310	1.	Diseases of the heart	88	229.6	135.1	1.7
790	2.	Accidents/adverse effects	63	122.4	20.4	6.0
150	3.	Malignant neoplasms	59	159.6	108.6	1.5
620	4.	Liver disease/cirrhosis	40	109.0	7.4	14.7
260	5.	Diabetes mellitus	18	50.4	9.6	5.2
740	6.	Conditions arising in perinatal period	15	16.7	8.2	2.0
430	7.	Cerebrovascular diseases	14	32.6	35.4	0.9
510	8.	Pneumonia/influenza	14	30.1	9.2	3.3
830	9.	Homicide	9	16.2	4.3	3.8
540	10.	Chronic pulmonary diseases	8	23.6	9.5	2.5
640	11.	Nephritis, et al	7	16.6	3.6	4.6
630	12.	Cholelithiasis/gallbladder	4	8.9	0.7	12.8
730	13.	Congenital anomalies	4	4.4	5.5	0.8
090	14.	Septicemia	3	9.1	2.4	3.8
140	15.	All other infectious/parasitic diseases	3	6.9	1.3	5.3
		All others	75	161.0	59.2	2.7
ALL	....	All causes	424	997.1	420.4	2.4
Males:						
790	1.	Accidents/adverse effects	168	354.5	60.2	5.9
310	2.	Diseases of the heart	119	340.3	271.2	1.3
150	3.	Malignant neoplasms	51	153.6	163.7	0.9
620	4.	Liver disease/cirrhosis	40	114.8	16.0	7.2
820	5.	Suicide	29	61.6	18.0	3.4
830	6.	Homicide	29	57.4	16.7	3.4
430	7.	Cerebrovascular diseases	20	57.8	41.7	1.4
510	8.	Pneumonia/influenza	15	41.2	16.6	2.5
540	9.	Chronic pulmonary disease	11	31.9	26.2	1.2
260	10.	Diabetes mellitus	9	25.5	10.0	2.6
090	11.	Septicemia	7	20.9	3.4	6.2
740	12.	Conditions arising in perinatal period	7	7.9	10.3	0.8
140	13.	All other infectious/parasitic diseases	5	12.3	1.7	7.2
640	14.	Nephritis, et al	5	11.6	5.6	2.1
030	15.	Tuberculosis	4	12.5	1.0	12.5
		All others	97	235.6	91.0	2.6
ALL	....	All causes	616	1,539.4	753.3	2.0

[a] Equivalence to ICD-9 code available from the Indian Health Service.

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

monia and influenza, and homicide. These causes accounted for 75 percent of all deaths (see table 4-13). Deaths from other causes are too small from which to draw solid inferences, but severe health problems are suggested in the finding that the rates of almost all major causes of Indian deaths in Billings exceeded that of U.S. all races.

The Billings area crude death rate from accidents of all types declined an estimated 11 percent between 1972 and 1982 (table 4-38), but accidents remained the leading cause of death among males, for whom the mortality rate was almost six times that of U.S. all races males. This ratio also applied to females, although in 1980 to 1982 accidents were not the leading cause of death for females. While suicide and homicide were the 10th and 11th causes of death for U.S. all races populations in 1981, they were the 5th and 6th leading causes of death among Billings males, each having claimed 29 lives in the 3-year period centered in 1981. The age of suicides in 1980 to 1981 was different from both U.S. all races and other IHS areas. The greatest single number of Billings

Table 4-38.—Changes in Crude Death Rates, 1972-82: IHS Billings Area (rate per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
790	Accidents/adverse effects	236.4	214.3	209.5	−11.4
310	Diseases of the heart	190.2	185.6	187.7	−1.3
150	Malignant neoplasms	84.4	80.0	99.8	18.2
620	Liver disease/cirrhosis	69.8	66.6	72.6	4.0
510	Pneumonia/influenza	55.1	32.8	26.3	−52.3
430	Cerebrovascular disease	36.0	29.7	30.8	−14.3
740	Conditions arising in perinatal period	32.6	28.7	20.0	−38.8
820	Suicide	29.2	20.5	29.0	−0.6
820	Homicide	23.6	25.6	34.5	46.1
730	Congenital anomalies	14.6		7.3	−50.3
	All other causes	243.7	219.8	225.8	−7.1
ALL	All causes	1,015.6	903.6	943.3	−7.1

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1986. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1986.

area suicides occurred in the 15 to 24 age group, while this age group was among the lowest for U.S. all races in 1981.

Hospitalizations and outpatient visits reflect the impact of accidents and other violence. Hospitalizations for injuries and poisonings occurred at a rate almost twice that for all IHS direct and contract hospitals and U.S. non-Federal short-stay hospitals. Lacerations and open wounds accounted for 2.7 percent of male outpatient visits, and dislocations, sprains, and strains accounted for another 2 percent (see table 4-39).

Deaths from diseases of the heart have remained relatively stable, from a crude rate of 190.2 per 100,000 population (169 deaths) in 1972 to 1974, to 185.6 (181 deaths) in 1975 to 1977, and to 187.7 (207 deaths) in 1980 to 1982, a decrease of only 2.4 percent. Based on data for 1980 to 1982, Billings area males are 1.25 times as likely as U.S. all races males to die from diseases of the heart, particularly acute myocardial infarction, making heart disease the second leading cause of male deaths. The ratio is worse for females, who are 1.7 times as likely as their U.S. all races counterparts to die of heart disease. The 88 heart disease deaths in 1980 to 1982 accounted for 21 percent of Billings area female deaths. Cerebrovascular mortality was also the seventh leading cause of death for males and females, although absolute numbers were small. Consistent with the high rate of cardiovascular mortality, hospitalizations for diseases of the circulatory system occurred at a rate twice that of IHS areas on average, though a little less than that of U.S. non-Federal short-stay hospitals.

Malignant neoplasms were the third leading cause of death in 1980 to 1982. In the decade between 1972 and 1982, the cancer mortality rate increased from a crude rate of 84.4 per 100,000 population to 99.8 per 100,000, an 18-percent increase, although absolute numbers are small and changes should be interpreted cautiously. In the 3-year period centered in 1981, 51 males and 59 females died of cancer. As in Aberdeen and Bemidji, age-adjusted cancer death rates exceeded the U.S. all races rate by 1.5 for women, but did not exceed the U.S. rate for men. Cancer of the respiratory system was the leading cause of cancer deaths in both sexes. Data indicating that 1984 hospitalizations for cancer occurred at twice the rate of IHS hospitals in all areas indicate that cancer continues to be a problem in Billings relative to other IHS areas.

Unlike the experience in other IHS areas, the Billings diabetes crude death rate increased from 16.4 per 100,000 population to 24.5 per 100,000 population in the 8-year period from 1975 to 1982. Small numbers indicate that inferences should be

Table 4-39.—Fifteen Most Frequent Outpatient Diagnoses:[a] Billings Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	480	Prenatal care	11,037	5.6
2.	300	Upper respiratory infection, common cold	8,960	4.6
3.	819	Other preventive health services	6,663	3.4
4.	080	Diabetes mellitus	6,475	3.3
5.	251	Chronic otitis media with/without mastoiditis	6,342	3.2
6.	823	Tests only (lab, X-ray)	6,192	3.2
7.	820	Hospital medical/surgical followup	5,068	2.6
8.	821	Physical examination	4,704	2.4
9.	812	Other ill-defined, undiagnosed diseases	4,203	2.1
10.	818	Well child care	4,165	2.1
11.	301	Pharyngitis and tonsillitis (nonstrep)	3,940	2.0
12.	810	All other symptoms	3,932	2.0
13.	400	Urinary tract infection	3,181	1.6
14.	283	Hypertensive disease	2,886	1.5
15.	827	All other	38,362	19.6
Male:				
1.	251	Chronic otitis media with/without mastoiditis	6,894	5.2
2.	300	Upper respiratory infection, common cold	6,385	4.8
3.	821	Physical examination	5,224	3.9
4.	812	Other ill-defined, undiagnosed diseases	4,801	3.6
5.	819	Other preventive health services	4,714	3.5
6.	820	Hospital medical/surgical followup	4,154	3.1
7.	818	Well child care	4,087	3.1
8.	080	Diabetes mellitus	4,063	3.0
9.	730	Laceration, open wound	3,546	2.7
10.	823	Tests only (lab, X-ray)	3,202	2.4
11.	301	Pharyngitis and tonsillitis (nonstrep)	2,776	2.1
12.	810	All other symptoms	2,672	2.0
13.	283	Hypertensive disease	2,579	1.9
14.	702	Dislocations, sprains, and strains	2,513	1.9
15.	827	All other	25,320	18.9
		All other causes, both sexes	133,339	
	ALL	All causes, both sexes	332,379	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Billings total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

made cautiously, but the growing significance of the diabetes problem is also reflected in the Billings hospitalization rate. The 217 hospital discharges for diabetes in 1984 (195) equaled a rate of 54.1 discharges per 10,000 population, more than twice the diabetes discharge rate for U.S. short-stay non-Federal hospitals (see table 4-19), although, as is typical, the proportion of hospitalizations was lower than the proportion of deaths. Outpatient encounters for diabetes were, however, relatively low in Billings (about 3 percent of visits compared to an IHS average of 4.4), and despite the high rate of hospitalization for diabetes, refractive disorders were not among the top 15 clinical impressions.

Both neonatal and postneonatal infant mortality were higher in 1980 to 1982 than for U.S. all races, but not as high as the infant death rates for several other IHS areas (see figure 4-16). The single largest cause of infant deaths in Billings, as in most other IHS areas, was sudden infant death syndrome (175a).

Billings is no different from other areas in that alcohol abuse has been implicated in almost all the leading causes of death. High death rates from liver disease and cirrhosis, the fourth leading cause of death, confirm the alcoholism problem. In 1980 to 1982 the male death rate from liver disease and cirrhosis was more than 7 times that of U.S. all races males, and the female death rate was more than 14 times that of U.S. all races females. As another indicator of the alcohol abuse problem, the hospitalization rate for Billings Indians for alcohol-related conditions was substantially greater than that of both IHS and U.S. non-Federal short-stay hospitals.

Both otitis media and urinary tract infections were among the leading causes of outpatient visits. In 1984, 6,894 (5.2 percent) of male outpatient visits, and 6,342 (3.2 percent) of female outpatient visits to Billings area IHS facilities were for chronic otitis media, making the condition the second leading cause of outpatient visits for males and the third for females. Billings had the third highest rate of hospitalizations for otitis media of IHS areas, at a rate more than twice that of U.S. non-Federal short-stay hospitals.

Mental disorders accounted for a higher proportion of hospitalizations in Billings than in other IHS areas. In Billings, 474 discharges for mental disorders were made in direct and contract hospitals in 1984, for a rate of 118.1 per 10,000 service population. The U.S. short-stay non-Federal hospital rate for 1984 was considerably lower, 72.1 (203). Two-thirds of Billings inpatient visits were for disorders related to alcohol abuse. Mental disorders, however, were not among the 15 leading reasons for outpatient visits in Billings, although one or more categories of mental disorders were among the leading reasons for outpatient encounters in several of the Billings service units (175).

California Program

The California program covers an estimated 73,262 of California's 216,070 Indians.

While data pertaining to the health status of all other IHS programs and areas have their limitations, information about Indians in California is practically nonexistent. This state of affairs exists for several reasons, the primary one being the loss of reservation lands as a consequence of changing and diverse Federal policies applied to California Indians. The California population is a great ethnic mix, with a great number of Hispanics and individuals who are part Hispanic, and Indians from countries other than the United States, making identification of "Indians" difficult. Thus, Indians may be harder to recognize as Indians for vital statistics purposes (births and deaths), although they may be likely to identify themselves as such for U.S. Census purposes. As a consequence, natality and mortality statistics are said to be seriously underreported. Although no one knows how extensive the undercounting is, it is clear that 471 deaths in 3 years for the service population of nearly 70,000 people and 1,056 Indian deaths among the estimated 216,000 Indians in the entire State of California is very unlikely. Those numbers of deaths would reflect mortality rates of 278.74 and 201.7, half that of the U.S. all races rate and even lower than the death rates of some of the wealthiest counties in the country. Douglas County (Colorado) for example, the seventh wealthiest county with a median family income of $30,154 in 1979, had an age-adjusted death rate of 362.4 per 100,000 population in 1981. The 1980 age-adjusted death rates for Montgomery County (Maryland), the sixth wealthiest county in the Nation, was 460.7 per 100,000 population. The lack of valid mortality data might be remedied by the availability of patient care statistics, but there are no IHS direct care facilities in California, and IHS-funded facilities administered by Indian organizations are neither required to report on reasons for treatment, nor provided the equipment to do so efficiently and compatibly with IHS patient care systems (43).

However, while actual mortality rates appeared invalid to California Indian health care administrators, officials and tribal members contacted by OTA agreed that, based on their experience, the rank order of causes reflected in the mortality statistics was probably correct. In fact, the rank order is comparable to that of causes of death for Indians in other IHS areas. The leading causes of death among California Indians in 1980 to 1982 were estimated to be, in descending order, diseases of the heart; accidents; malignant neoplasms; cerebrovascular disease; chronic liver disease and cirrhosis; homicide; diabetes mellitus; suicide; pneumonia; chronic pulmonary disease; nephritis, nephrotic syndrome, and nephrosis; certain conditions originating in the perinatal period;

atherosclerosis; tuberculosis; and other diseases of arteries, arterioles, and capillaries. These data indicate that Indians in California experience much the same health problems as Indians in other parts of the country.

Nashville Program

It is difficult to write of the Nashville program in the same sense that other IHS programs and areas are discussed. Indian areas in the Nashville program are widely dispersed. Currently, the area serves an estimated 36,000 Indians in nine reservation States: Alabama, Mississippi, Louisiana, Florida, North Carolina, Pennsylvania, New York, Connecticut, and Maine (see figure 1-3 in ch. 1). However, unlike most other IHS areas, the reservation States included in the Nashville program contain more Indians who are not eligible for IHS service than they contain IHS service-eligible Indians (table 4-1). (The Nashville program office is located in Tennessee, which is not a reservation State, although it has an estimated 5,372 Indian residents).

There is little demographic, social, housing, and economic information about Indians served by the Nashville program. Many of the reservations are so small that the census will not release information on their social, economic, and housing characteristics in order to maintain confidentiality. The socioeconomic information that is available varies considerably across reservations. Based on data released by the U.S. Census Bureau, for example, the percent of Nashville area reservation Indians aged 25 and over who were high school graduates ranges from 69.4 percent among the Shinnecocks, a reservation of only 261 individuals in New York State, to 30.1 percent on the Indian Township Reservation in Maine, a reservation estimated to have only 384 Indians (146). Median family income ranged from $26,250 on a reservation in Connecticut to $6,250 on a reservation in Maine, and the percent of Indian homes lacking plumbing ranged from 0 to 39.6 percent (145). Bureau of Indian Affairs reports employment data for only six of the reservation States in the Nashville area. In these States, from 28 (Mississippi) to 60 percent (New York) of the labor force was estimated to be able to work but unemployed in January 1985 (209).

In the 1980-82 period, 557 Indian residents of IHS service areas in the Nashville area died, for an overall age-adjusted mortality rate of 765.4 per 100,000 population, a rate 1.3 times the U.S. all races rate (1.4 for females and 1.3 for males; see table 4-40). Because of the dispersion of Nashville area Indians, it is possible that the death rate is understated. In addition, as shown in table 4-41, in most service units the number of deaths that was reported was too small from which firm conclusions could be drawn. The largest service units, which contained the largest numbers of deaths, were the Seneca, the Cherokee, and the Choctaw; and the service units with the worst Indian to U.S. all races ratios were the Choctaw, the Seneca, and the St. Regis Mohawk, although all service units but the Seminole had age-adjusted mortality rates exceeding the U.S. all races average.

The leading cause of death was diseases of the heart, with the mortality rate exceeding that of U.S. all races by 1.3 for females, and 1.1 for males. The leading cause of death among males was accidents. In 1980 to 1982 Indian males died from accidents at an average rate 2.7 times that of U.S. all races in 1981. For females, on the other hand, accidents were the fifth leading cause of death. Suicide and homicide were the fifth and sixth causes of death among Nashville males, exceeding the rate for U.S. all races males by 1.7 and 1.9 times, respectively. As shown in table 4-43, the number of females who died from these two violent causes in 1980 to 1982 was too small for valid conclusions to be drawn.

On average, male deaths from cancer occurred at a rate lower than that of U.S. all races, except for cancer of the digestive system, which occurred at 1.2 times the U.S. rate for both sexes. The circumstances of the Nashville program make discussion of the absolute numbers of other deaths inappropriate. It is also difficult to draw conclusions about health status from patient care data for the Nashville area, because there are only two IHS-supported hospitals (one of them tribally operated) and only 11 health centers/stations in four States to serve the Indian population, which, as noted, is dispersed over nine States. Thus, one would expect that many Indians, even if IHS service-eligible, obtain health care from other providers. The patient care data that are available, primarily from tribally administered facil-

Table 4-40.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Nashville IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Nashville area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
310	1.	Diseases of the heart	66	173.7	135.1	1.3
150	2.	Malignant neoplasms	41	116.8	108.6	1.1
430	3.	Cerebrovascular diseases	19	46.4	35.4	1.3
260	4.	Diabetes mellitus	13	34.2	9.6	3.6
790	5.	Accidents/adverse effects	12	26.4	20.4	1.3
510	6.	Pneumonia/influenza	9	22.5	9.2	2.4
620	7.	Liver disease/cirrhosis	7	21.3	7.4	2.9
830	8.	Homicide	5	13.1	4.3	3.0
640	9.	Nephritis, et al	3	7.1	3.6	2.0
730	10.	Congenital anomalies	3	6.4	5.5	1.2
740	11.	Conditions arising in perinatal period	3	6.4	8.2	0.8
820	12.	Suicide	2	4.2	5.7	0.7
090	13.	Septicemia	1	2.8	2.4	1.2
250	14.	Benign neoplasms, other	1	2.5	1.7	1.5
270	15.	Nutritional deficiencies	1	2.5	0.4	6.3
		All others	37	96.2	62.9	1.5
ALL	....	All causes	223	582.5	420.4	1.4
Males:						
310	1.	Diseases of the heart	89	285.0	271.2	1.1
790	2.	Accidents/adverse effects	62	159.0	60.2	2.6
150	3.	Malignant neoplasms	43	138.9	163.7	0.8
430	4.	Cerebrovascular diseases	19	60.9	41.7	1.5
260	5.	Diabetes mellitus	14	46.7	10.0	4.7
820	6.	Suicide	14	30.4	18.0	1.7
830	7.	Homicide	14	31.4	16.7	1.9
620	8.	Liver disease/cirrhosis	12	41.1	16.0	2.6
510	9.	Pneumonia/influenza	11	29.4	16.6	1.8
740	10.	Conditions arising in perinatal period	10	21.0	10.3	2.0
840	11.	All other external conditions	3	6.0	2.2	2.7
090	12.	Septicemia	2	5.7	3.4	1.7
250	13.	Benign neoplasms, other	2	5.2	2.1	2.5
490	14.	Other arterial diseases	2	5.3	8.5	0.6
540	15.	Chronic pulmonary diseases	2	7.1	26.2	0.3
		All others	35	92.5	86.5	1.1
ALL	....	All causes	334	965.6	753.3	1.3

[a] Equivalence to ICD-9 code available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

ities, were summarized earlier and show that overall hospital discharges from Nashville facilities occur at a rate far lower than from other IHS and U.S. short-stay non-Federal hospitals. The only exceptions are the categories "supplementary classification" (for Nashville, this is primarily aftercare in IHS hospitals following discharge form contract hospitals) at a rate of 82.4 per 10,000 population, compared to an average IHS rate of 64 per 10,000 population and an average U.S. rate of 19.4 per 10,000 population; and "symptoms, signs and ill-defined conditions" (Nashville rate of 56.1, IHS rate of 57, and U.S. short-stay hospital rate of 22 per 10,000 population).

Hospitalization rates in the Nashville area in 1979 (166) were much higher than they were in 1984, which may reflect the decreasing pool of contract care funds (see ch. 6) and the increasing population base. Nashville is similar to other IHS areas in that "complications of pregnancy," including normal deliveries, is the first cause of hospitalization.

Nashville was also unusual in that outpatient visits for diseases of the teeth and gums were among the leading causes of visits for both males and females, and gastroenteritis and diarrhea were among the leading causes of visits for males (ta-

Table 4-41.—Estimated Deaths and Age-Adjusted Death Rates for Indians in the Nashville Program, by Service Unit, 1980-82

	Both sexes				
Service unit	Deaths	Age-adjusted death rate[a]	Ratio to U.S. all races rate	1980 service population	Leading causes
Cherokee	122	805.6	1.4	5,604	Male: Heart disease, cancer, accidents Female: Heart disease, cancer, diabetes mellitus
Chitimacha	5	428.3	NA	388	Male: Heart disease Female: Diabetes mellitus
Choctaw	108	865.5	1.5	4,155	Male: Accidents, heart disease, homicide, suicide Female: Cancer, heart disease, cerebrovascular disease
Coushatta	5	1,379.7	NA	234	Male Heart disease Female: Heart disease
Miccosukee	14	276.4	NA	1,729	Male: Accidents, suicide Female: Heart disease
Narragansett[b]	NA	NA	NA	[1,207][b]	
Passamaquoddy	28	813.6	1.4	1,346	Male: Cancer, heart disease, cerebrovascular disease Female: Heart disease, cerebrovascular disease, homicide
Penobscot	21	636.9	1.1	1,352	Male: Heart disease, cancer, accidents Female: Cancer, heart disease, pneumonia/influenza
Pequot[b]	NA	NA	NA	[821][b]	
Poarch Creeks[c]	NA	NA	NA	[4,612][c]	
Seminole	28	488.7	0.9	2,139	Male: Cancer, accidents Female: Cancer, heart disease
Seneca	170	876.0	1.5	7,258	Male: Heart disease, accidents, cancer, cerebrovascular disease Female: Heart disease, cancer, diabetes, cerebrovascular disease
St. Regis Mohawk	55	846.6	1.5	2,526	Male: Heart disease, cancer Female: Heart disease, cancer, cerebrovascular disease
Tunica Biloxi[d]	NA	NA	NA	[484][d]	
All	557	765.4	1.3	35,822	Male: Heart disease, accidents, cancer, cerebrovascular disease, diabetes Female: Heart disease, cancer, cerebrovascular, diabetes, accidents

[a] Rate per 100,000 population.
[b] Became a service unit in 1983; population shown is estimate for 1983. Deaths in 1980-82 not available.
[c] Became a service unit in 1984; population shown is estimate for 1984. Deaths in 1980-82 not available.
[d] Became a service unit in 1982; population shown is estimate for 1982. Deaths in 1980-82 not available.

SOURCES: **Indian deaths:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. **Population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Population Statistics Staff, "Estimated Indian and Alaska Native Service Population by Area and Service Unit," internal document, Rockville, MD, Feb. 1, 1985.

ble 4-42). The Choctaw and Cherokee service units account for most of the visits for gastroenteritis. The St. Regis Mohawk service unit stood out, because skin diseases were among the leading cause of visits for both males and females, and vitamin deficiencies and neuroses are among the leading causes of visits for females (175).

Navajo Area

The Navajo area serves the Navajo reservation located in the States of Arizona, New Mexico, and Utah. The service population in the Navajo area was estimated to be 162,005 in 1984.

In some respects the health status in the Navajo area is better than that of the U.S. all races population. Between 1972 and 1982, the Navajo area experienced a 31.2 percent decline in the crude death rate (see table 4-43), although the death rates from cancer and congenital anomalies rose in the same period. Of the 15 leading causes of death in 1980 to 1982, mortality rates were better on average than those of U.S. all races for dis-

Table 4-42.—Fifteen Most Frequent Outpatient Diagnoses:[a] Nashville Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	300	Upper respiratory infection, common cold	4,328	10.0
2.	819	Other preventive health services	2,834	6.6
3.	080	Diabetes mellitus	2,020	4.7
4.	480	Prenatal care	1,731	4.1
5.	283	Hypertensive disease	1,359	3.2
6.	250	Acute otitis media	1,303	3.1
7.	818	Well child care	1,124	2.6
8.	575	Other muskuloskeletal and connective tissue diseases	1,055	2.5
9.	823	Tests only (lab, X-ray)	919	2.2
10.	305	Respiratory allergy, asthma, and hay fever	836	2.0
11.	355	Diseases of teeth and gums	836	2.0
12.	808	Headache	788	1.8
13.	450	Infection of female genitalia (excluding VD)	728	1.7
14.	301	Pharyngitis and tonsillitis (nonstrep)	707	1.7
15.	827	All other	2,483	5.8
Male:				
1.	300	Upper respiratory infection, common cold	2,990	10.2
2.	819	Other preventive health services	1,674	5.7
3.	283	Hypertensive disease	1,357	4.6
4.	080	Diabetes mellitus	1,172	4.0
5.	250	Acute otitis media	1,136	3.9
6.	818	Well child care	1,009	3.4
7.	575	Other musculoskeletal and connective tissue disease	868	3.0
8.	730	Laceration, open wound	805	2.7
9.	305	Respiratory allergy, asthma, and hay fever	719	2.4
10.	731	Superficial injury, contusion	698	2.4
11.	821	Physical examination	687	2.3
12.	355	Diseases of teeth and gums	604	2.1
13.	014	Gastroenteritis, diarrhea, etc.	591	2.0
14.	702	Dislocations, sprains, and strains	548	1.9
15.	827	All other	1,630	5.5
		All other causes, both sexes	33,520	
	ALL	All causes, both sexes	73,059	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Nashville total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

eases of the heart (although it was the second leading cause of death among Navajo), cancer, cerebrovascular disease, chronic and obstructive pulmonary disease, and neonatal mortality. However, for the remaining leading causes of death, and for several other causes, Navajo mortality exceeded that of U.S. all races in the 3-year period centered in 1981 (table 4-44).

The death rate from accidents, the leading cause of deaths in Navajo Indians of both sexes, exceeded that of U.S. all races by 4 times, 4.5 times for males, and 3.5 times for females. Navajo males were 1.3 times as likely as U.S. all races males to die from suicide, and 1.5 times as likely to die by homicide. Consistent with the high rate of death by violence, the Navajo hospitalization rate for injuries and poisonings was relatively high as IHS areas go (142.8 per 100,000 population; see table 4-19), but the excess mortality among Navajos would seem to warrant an even higher hospitalization rate. Outpatient encounters in Navajo reinforce the impression that social causes of morbidity and mortality are prevalent. The categories of lacerations and open wounds, superficial injury or contusion, and fracture of the extremities accounted for 8.2 percent of male outpatient visits in 1984 (see table 4-45).

The Navajo female death rate for diabetes also exceeded that of U.S. all races females, and the high female death rate from chronic renal failure

Table 4-43.—Changes in Crude Death Rates, 1972-82: IHS Navajo Area (rate per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
790	Accidents/adverse effects	241.7	196.8	155.1	−35.8
800	Motor vehicle accidents	153.0	130.4	90.2	−41.0
810	All other accidents	88.7	66.3	53.8	−39.3
310	Diseases of the heart	68.0	52.5	58.7	−13.6
510	Pneumonia/influenza	43.5	41.8	26.8	−38.4
150	Malignant neoplasms	42.0	44.0	51.6	22.8
620	Liver disease/cirrhosis	26.6	22.8	14.1	−47.1
740	Conditions arising in perinatal period	25.3	18.9	8.9	−64.7
430	Cerebrovascular disease	23.5	17.6	13.9	−41.1
830	Homicide	22.2	17.8	13.2	−40.2
820	Suicide	19.7	21.4	11.8	−39.9
	Enteritis, other diarrheal disease	11.9			
	All other causes	259.7	215.8	185.1	−28.6
All	All causes	784.1	648.6	539.2	−31.2

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-66 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

(22 deaths in the 1980-82 period, four times greater than the U.S. all races female rate) may be related to excess morbidity from diabetes. The Navajo male death rates from diabetes and renal failure also exceeded the U.S. all races male rates, but not by as much. It is interesting, then, that the 1984 hospitalization rate for diabetes was 16.5 per 10,000 population, a rate substantially below that of U.S. all races (25.3) and the IHS on average (26.2).

Among IHS areas, the Navajo have a fairly low infant mortality rate (12.8 in 1980 to 1982), although it still exceeded that of U.S. all races (11.9 in 1981). The postneonatal rate in Navajo (8.6), however, was more than twice that of U.S. all races. Unlike most other areas, SIDS was not the single most significant cause of death among Navajo postneonates. Eight Navajo infants died of congenital anomalies of the heart, eight from meningitis, and eight from SIDS in 1980 to 1982 (175a).

Deaths from liver disease and cirrhosis were the fifth leading cause of death among the Navajo, although the death rate from this cause, 21.4 per 100,000 population, was fairly low among IHS areas (an average of 48.1 per 100,000 IHS service population, compared to 11.4 for U.S. all races). Navajo hospitalizations for alcoholic liver disease (2.8 per 10,000 population in 1984) were low relative to most other IHS areas (4.4), but higher than those of U.S. all races. Hospitalizations for mental disorders, including alcohol dependence syndrome, were extremely low in Navajo (a discharge rate of 38.3 per 10,000 population) compared to the U.S. rate (72 per 10,000 population), and even compared to the IHS average rate (57 per 10,000 population). In addition, infant deaths from congenital anomalies may be due to fetal alcohol syndrome, the prevention of which has been the focus of a special effort among Indians (77). Pneumonia mortality and morbidity may also be related to alcohol abuse (100); among the Navajo, pneumonia is the fourth leading cause of death for both males and females.

In addition to disorders that lead eventually to death, the Navajo had a high prevalence of otitis media, upper respiratory infections, strep throat, and musculoskeletal and connective tissue disorders.

Thus, the Navajo area can be characterized as one whose health status has improved substantially in recent years and that has lower mortality rates for some of the leading causes of death in the general U.S. population—cancer, heart and

Table 4-44.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Navajo IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate: Indians	Age-adjusted mortality rate: U.S. all races	Ratio of Navajo area Indians to U.S. all races
Females:						
790	1.	Accidents/adverse effects	149	71.3	20.4	3.5
150	2.	Malignant neoplasms	132	85.6	108.6	0.8
310	3.	Diseases of the heart	108	62.7	135.1	0.5
510	4.	Pneumonia/influenza	50	23.9	9.2	2.6
620	5.	Liver disease/cirrhosis	32	20.5	7.4	2.8
430	6.	Cerebrovascular diseases	31	16.6	35.4	0.5
730	7.	Congenital anomalies	28	7.9	5.5	1.4
640	8.	Nephritis, et al	24	13.2	3.6	3.7
260	9.	Diabetes mellitus	23	15.3	9.6	1.6
740	10.	Conditions arising in perinatal period	13	3.5	8.2	0.4
830	11.	Homicide	12	5.7	4.3	1.3
090	12.	Septicemia	10	5.9	2.4	2.5
270	13.	Nutritional deficiencies	8	3.3	0.4	8.2
630	14.	Cholelithiasis/gallbladder disease	7	4.0	0.7	5.7
030	15.	Tuberculosis	6	3.7	0.4	9.3
		All others	267	143.8	69.2	2.1
ALL	....	All causes	900	486.9	420.4	1.2
Males:						
790	1.	Accidents/adverse effects	496	271.1	60.2	4.5
310	2.	Diseases of the heart	155	93.3	271.2	0.3
150	3.	Malignant neoplasms	99	65.8	163.7	0.4
510	4.	Pneumonia/influenza	70	34.2	16.6	2.1
820	5.	Suicide	49	23.7	18.0	1.3
830	6.	Homicide	47	25.6	16.7	1.5
430	7.	Cerebrovascular diseases	31	17.5	41.7	0.4
620	8.	Liver disease/cirrhosis	31	22.2	16.0	1.4
730	9.	Congenital anomalies	30	8.9	6.1	1.5
740	10.	Conditions arising in perinatal period	27	6.9	10.3	0.7
670	11.	Renal failure, et al	17	10.9	4.9	2.2
840	12.	All other external causes	19	11.3	2.2	5.1
260	13.	Diabetes mellitus	18	13.2	10.0	1.3
140	14.	All other infectious/parasitic diseases	11	5.3	1.7	3.1
540	15.	Chronic pulmonary diseases	11	7.0	26.2	0.3
		All others	403	328.2	87.8	3.7
ALL	....	All causes	1,514	845.1	753.3	1.1

[a] Equivalence to ICD-9 code available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1986.

other cardiovascular disease, and chronic pulmonary disease. But it is an IHS area with one of the highest rates of death due to accidents, and greater than U.S. all races rates of death due to pneumonia and influenza, diabetes, and infectious diseases. The high rate of death from accidents was not accompanied by higher hospitalization rates for injuries.

Oklahoma City Area

The Oklahoma City area covers the State of Oklahoma and a small part of the State of Kansas. IHS estimated the Oklahoma City area service population to be 190,451 in 1984. It further estimated that 49.6 percent of the Indian population of the State of Oklahoma, and 70.8 percent of the Indian population of the State of Kansas live in urban areas.

Oklahoma Indians appear to have relatively favorable health statistics, although deaths among Indians may be underreported because Oklahoma Indians are well-integrated into the general population of Oklahoma. Higher rates of employment (209) may mean that Oklahoma Indians are more likely to have sources of health care other than those of IHS, which would also tend to understate morbidity indicators taken from IHS patient

Table 4-45.—Fifteen Most Frequent Outpatient Diagnoses:[a] Navajo Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	480	Prenatal care	37,608	9.3
2.	300	Upper respiratory infections, common cold	33,598	8.3
3.	819	Other preventive health services	19,702	4.9
4.	250	Acute otitis media	19,540	4.8
5.	821	Physical examination	12,728	3.2
6.	080	Diabetes mellitus	11,673	2.9
7.	818	Well child care	11,629	2.9
8.	210	Refractive error	8,869	2.2
9.	301	Pharyngitis, tonsillitis, (nonstrep)	8,644	2.1
10.	823	Tests only (lab, X-ray)	8,586	2.1
11.	400	Urinary tract infection	8,528	2.1
12.	575	Other muskuloskeletal, connective tissue diseases	8,427	2.1
13.	283	Hypertensive disease	8,267	2.0
14.	022	Strep throat	7,951	2.0
15.	827	All other	13,082	3.2
Male:				
1.	300	Upper respiratory infections, common cold	24,884	9.4
2.	250	Acute otitis media	19,791	7.5
3.	818	Well child care	11,852	4.5
4.	730	Lacerations, open wounds	10,298	3.9
5.	283	Hypertensive disease	8,400	3.2
6.	821	Physical examination	8,107	3.1
7.	819	Other preventive health services	7,541	2.8
8.	575	Other muskuloskeletal, connective tissue diseases	6,998	2.6
9.	080	Diabetes mellitus	6,955	2.6
10.	301	Pharyngitis, tonsillitis (nonstrep)	5,962	2.2
11.	751	Superficial injury, contusion	5,915	2.2
12.	022	Strep throat	5,788	2.2
13.	701	Fracture of extremity	5,575	2.1
14.	210	Refractive error	5,312	2.0
15.	827	All other	8,427	3.2
		All other causes, both sexes	337,515	
	ALL	All causes, both sexes	698,150	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Navajo total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

care data. Furthermore, the high population of Indians living in urban areas tends to make more alternate sources of health care available, although as a practical matter access to health care even in urban areas depends largely on socioeconomic status.

In the 1980-82 period, 2,873 Indians in the Oklahoma City area were reported to have died, for an average age-adjusted mortality rate of 530.6 per 100,000 population (table 4-46), a rate less than that of U.S. all races for 1981 (568.2). Oklahoma Indians had lower death rates than the U.S. all races population for diseases of the heart, cerebrovascular disease, cancer, suicide, and infant mortality, and had age-adjusted death rates equal to that of the general population for conditions arising in the perinatal period and, unusual for IHS areas, in the postneonatal period. The crude death rate declined 13 percent in the 1972 to 1982 decade. Although the crude death rate from cancer increased an estimated 8.7 percent (see table 4-47), a rise in cancer rates is compatible with increasing life expectancy. However, Oklahoma Indians had other death rates and ratios resembling those of Indians in other IHS areas. Accidents were the third leading cause of death at a rate of 66.9 for both sexes, a rate 1.7 times that of U.S. all races. Diabetes was the fifth leading cause of death, with a rate of 26.9 for both

Table 4-46.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Oklahoma IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Oklahoma area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
310	1.	Diseases of the heart	335	96.5	135.1	0.7
150	2.	Malignant neoplasms	211	72.8	108.6	0.7
430	3.	Cerebrovascular diseases	109	30.0	35.4	0.8
790	4.	Accidents/adverse effects	93	34.5	20.4	1.7
260	5.	Diabetes melitus	73	27.0	9.6	2.8
620	6.	Liver disease/cirrhosis	46	19.1	7.4	2.6
510	7.	Pneumonia/influenza	36	9.9	9.2	1.1
740	8.	Conditions arising in perinatal period	28	8.8	8.2	1.1
640	9.	Nephritis, et al	26	8.1	3.6	2.3
730	10.	Congenital anomalies	18	6.0	5.5	1.1
830	11.	Homicide	17	7.4	4.3	1.7
480	12.	Atherosclerosis	14	3.5	4.6	0.8
540	13.	Chronic pulmonary diseases	11	3.7	9.5	0.4
090	14.	Septicemia	9	2.7	2.4	1.1
490	15.	Other arterial diseases	8	2.7	3.0	0.9
		All others	175	60.6	53.6	1.1
ALL	....	All causes	1,209	393.3	420.4	0.9
Males:						
310	1.	Diseases of the heart	494	208.8	271.2	0.8
790	2.	Accidents/adverse effects	251	101.2	60.2	1.7
150	3.	Malignant neoplasms	239	102.3	163.7	0.6
430	4.	Cerebrovascular diseases	73	29.3	41.7	0.7
620	5.	Liver disease/cirrhosis	69	32.3	16.0	2.0
260	6.	Diabetes mellitus	59	27.0	10.0	2.7
510	7.	Pneumonia/influenza	51	18.8	16.6	1.1
830	8.	Homicide	44	17.9	16.7	1.1
740	9.	Conditions arising in perinatal period	32	9.7	10.3	0.9
820	10.	Suicide	30	12.2	18.0	0.7
540	11.	Chronic pulmonary diseases	28	11.8	26.2	0.5
640	12.	Nephritis, et al	19	7.3	5.6	1.3
090	13.	Septicemia	16	6.5	3.4	1.9
730	14.	Congenital anomalies	11	3.5	6.1	0.6
480	15.	Atherosclerosis	9	3.0	6.0	0.5
		All others	239	101.4	81.6	1.2
ALL	....	All causes	1,664	693.0	753.3	0.9

[a] Equivalence to ICD-9 code available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

sexes, equal to 2.7 times the U.S. all races rate. Liver disease and cirrhosis was the sixth leading cause of death, with a rate of 25.4, 2.2 times the rate of U.S. all races. Pneumonia and influenza, the seventh leading cause of death, had a rate of 13.7, a ratio of 1.0 for females and 1.1 for males compared to the U.S. population. Homicide was the eighth leading cause of death at a rate of 12.6 for both sexes, equal to a ratio of 1.7 for females, and 1.0 for males when compared to the U.S. population. The crude death rate for motor vehicle accidents increased by almost 13 percent between 1972 and 1982.

In addition to problems of interpretation caused by the presence of alternative health care sources, hospitalization rates for Oklahoma Indians are difficult to interpret because IHS does not collect diagnostic data on the tribally administered hospital in the Claremore service unit. For this report, hospitalization rates were derived by excluding only the Claremore service unit population from the population denominator, which may tend to overstate hospital discharge rates. Nevertheless, some hospital discharge rates are what might be expected, or even lower than expected, given the pattern of mortality. Thus, for exam-

Table 4-47.—Changes in Crude Death Rates, 1972-82: IHS Oklahoma Area (rate per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
310	Diseases of the heart	186.6	164.9	156.5	−16.1
150	Malignant neoplasms	78.1	81.0	84.9	8.7
790	Accidents/adverse effects	71.2	66.0	64.9	−8.8
800	Motor vehicle accidents	40.0	40.9	45.1	12.8
810	All other accidents	31.1	25.0	19.8	−36.3
430	Cerebrovascular disease	49.9	45.6	34.4	−31.2
260	Diabetes mellitus	27.0	23.8	24.9	−7.7
620	Liver disease/cirrhosis	24.2	34.4	21.7	−10.3
510	Pneumonia/influenza	22.9	24.8	16.4	−28.3
830	Homicide	15.1	12.1	11.5	−23.8
740	Conditions arising in perinatal period	9.6	13.3	11.3	17.8
820	Suicide	8.5	7.0	6.6	−22.2
	All other causes	130.2	119.0	109.2	−16.1
ALL	All causes	623.3	651.9	542.3	−13.0

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

ple, the hospitalization rate for injuries and poisonings (74.6 per 10,000 service population) seems low relative to the area's death rates for accidents and homicide. The same can be said for hospitalizations for diabetes; even though the Oklahoma death rate exceeded that of U.S. all races, the area's hospitalization rate for diabetes (23.5 per 10,000 population, excluding Claremore) is about the same as that of U.S. all races.

Hospitalizations for conditions arising in the perinatal period (14.7 per 10,000 population in 1984) were higher than expected—more than twice the rate for U.S. short-stay non-Federal hospitals (7.1)—given that the infant mortality rate in the Oklahoma area was lower than that of U.S. all races in the 1980-82 period. The Oklahoma 1979 hospitalization rate for conditions arising in the perinatal period (5.7) was closer to what might have been expected in 1980 to 1982, as was the 1979 hospitalization rate for pregnancies with complications (36 percent of hospitalizations for pregnancies (166)).

Outpatient visits in Oklahoma are similar to that for the general U.S. population (i.e., high proportions of visits for hypertension, upper respiratory infections, prenatal care, well child care), except for higher percentages of care for refractive disorders and diabetes relative to the U.S. all races population (table 4-48) (200).

Phoenix Area

The Phoenix area served an estimated 82,309 Indians in 1984, primarily in Arizona. Indians in Nevada and Utah are also included in the Phoenix service area.

As shown in table 4-49, the mortality rate in the Phoenix area has declined almost 20 percent since the 3-year period centered in 1972 to 1974, although changes in Phoenix area health status are difficult to interpret. The boundaries of the service area have changed since the early 1970s when the Phoenix area included small service units in Idaho, Oregon, and California (157). One should be cautious in drawing conclusions from hospitalization data as well, because the Phoenix area is the site of the Phoenix Indian Medical Center, a teaching and referral hospital of IHS.

In 1980 to 1982 the Phoenix area age-adjusted mortality rate was 918.2 for all causes, 1.6 times the U.S. all races rate (see table 4-50). The leading cause of the 1,711 deaths in the area in 1980 to 1982 was accidents, which occurred at a rate 3.8 times the U.S. all races rate for males and 3.9

Table 4-48.—Fifteen Most Frequent Outpatient Diagnoses:[a] Oklahoma Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	480	Prenatal care	31,199	7.6
2.	819	Other preventive health services	28,936	7.0
3.	283	Hypertensive disease	26,676	6.5
4.	080	Diabetes mellitus	22,385	5.4
5.	210	Refractive error	19,206	4.7
6.	300	Upper respiratory infection, common cold	17,518	4.2
7.	818	Well child care	11,281	2.7
8.	823	Tests only (lab, X-ray)	10,926	2.6
9.	250	Acute otitis media	10,065	2.4
10.	821	Physical examination	9,712	2.4
11.	400	Urinary tract infection	7,618	1.8
12.	461	Other gynecologic problems	6,812	1.7
13.	575	Other musculoskeletal, connective tissue diseases	6,014	1.5
14.	301	Pharyngitis and tonsillitis (nonstrep)	5,847	1.4
15.	827	All other	37,199	9.0
Male:				
1.	283	Hypertensive disease	18,153	7.7
2.	300	Upper respiratory infection, common cold	13,191	5.6
3.	819	Other preventive health services	12,848	5.5
4.	080	Diabetes mellitus	12,341	5.2
5.	210	Refractive error	12,328	5.2
6.	818	Well child care	11,120	4.7
7.	250	Acute otitis media	10,310	4.4
8.	305	Respiratory allergy, asthma, and hay fever	5,292	2.3
9.	823	Tests only (lab, X-ray)	5,078	2.2
10.	575	Other musculoskelatal, connective tissue disease	4,481	1.9
11.	520	Other diseases of the skin	4,091	1.7
12.	301	Pharyngitis and tonsillitis (nonstrep)	4,033	1.7
13.	355	Diseases of teeth, gums	4,006	1.7
14.	821	Physical examination	3,579	1.5
15.	827	All other	19,818	8.4
		All other causes, both sexes	269,179	
	ALL	All causes, both sexes	661,217	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Oklahoma total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

times the U.S. all races rate for females. Deaths from other forms of violence also ranked high in the Phoenix area. Suicide was the sixth leading cause of death for males, at a rate 2.6 times that of U.S. all races males, and the male death rate as a result of homicide was 3.2 times that of U.S. all races males. Although the 1984 Phoenix area hospitalization rate for injuries and poisonings was almost double that of U.S. short-stay non-Federal hospitals (table 4-19), the ratio between Phoenix and U.S. hospital discharges was still lower than the ratio of combined mortality rates for deaths by external cause (3.3, the average of the ratios for accidents, suicide, homicide, and all other external causes).

Outpatient information confirms the prevalence of violent injury among Phoenix area Indians. Together, lacerations and open wounds; dislocations, sprains and strains; superficial injuries and contusions; and fractures of the extremities accounted for 9.6 percent of male outpatient visits in 1984 (see table 4-51).

Diseases of the heart were the second leading cause of death for Phoenix area Indians in 1980 to 1982, and cerebrovascular disease the ninth. The U.S. all races population had higher rates of death from these cardiovascular diseases, and from malignant neoplasms, which were the third leading cause of death for Phoenix area females

Table 4-49.—Changes in Crude Death Rates, 1972-82: IHS Phoenix Area (rates per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
790	Accidents/adverse effects	210.7	175.8	136.5	−35.2
800	Motor vehicle accidents	129.2	104.1	80.5	−37.7
810	All other accidents	81.4	71.6	56.0	−31.2
310	Diseases of the heart	99.7	97.8	130.0	30.4
620	Liver disease/cirrhosis	83.8	67.5	65.6	−21.7
510	Pneumonia/influenza	56.0	49.7	36.3	−35.1
150	Malignant neoplasms	51.3	54.9	53.8	4.9
820	Suicide	32.4	32.4	30.2	−6.8
830	Homicide	26.5	31.9	34.1	28.8
740	Conditions arising in perinatal period	17.1	21.4	12.7	−25.8
480	Atherosclerosis	16.5		2.6	−84.2
030	Tuberculosis	10.6		3.1	−70.1
	All other causes	306.2	284.4	243.8	−20.4
ALL	All causes	910.8	815.8	748.7	−17.8

[a] Includes atherosclerosis and tuberculosis, rates unknown.

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

and the fourth for Phoenix area males. The comparatively low rate of hospitalization in the Phoenix area for circulatory system diseases is somewhat consistent with these cardiovascular death rates, if a bit low compared to U.S. all races rates. Phoenix area hospitalization rates for cancer (16.9 per 10,000 population) were also well below the U.S. average in 1984 (87.8 per 10,000 population).

Despite a decline in the mortality rate from diabetes mellitus between 1975 to 1977 and 1980 to 1982, the disease was responsible for the deaths of 28 Phoenix area males and 44 females in the 1980-82 period, making diabetes the seventh leading cause of death. Deaths from renal failure and hospitalizations and outpatient encounters for diabetes were also indications of the incidence and severity of diabetes in the Phoenix area. Renal failure accounted for 30 deaths in 1980 to 1982, equal to 3.7 times the U.S. all races male death rate, and 5.9 times the U.S. all races female death rate. The Phoenix death rate from kidney disorders (nephritis, et al.) was one of the highest in the IHS system in 1980 to 1982 (see table 4-7). Hospitalization rates for diabetes in Phoenix (49.4 per 10,000 population) were almost double the U.S. all races and IHS all areas average rates in 1984. In 1984, diabetes was the leading cause of outpatient visits among Phoenix area women and the second leading cause of outpatient visits among Phoenix area men, accounting for 19,514 female visits and 10,806 male visits, resulting in a rate of 3,683.6 visits per 10,000 population. (The Phoenix area is the site of a long-term epidemiological study of diabetes among the Pima Indians.)

The death rate from pneumonia was also markedly high in the Phoenix area, 3.3 times the U.S. all races rate for males (50 Phoenix area deaths) and 3.7 times the U.S. all races rate for females (33 Phoenix area deaths). Consistent with the relatively high rate of deaths from pneumonia, upper respiratory infections were a leading cause of outpatient visits in 1984 (table 4-51). Hospitalization rates for respiratory system disease (200.1 per 10,000 population in 1984) substantially exceeded the U.S. short-stay non-Federal hospital rate.

The death rate from liver disease and cirrhosis was particularly high in Phoenix. Ninety-six males and 54 females died from liver disease and cirrhosis in 1980 to 1982, at rates 7.3 and 8.2 times the U.S. all races rate, making this the third leading cause of death in the area. The Phoenix hospitalization rate for alcoholic liver disease was

Table 4-50.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Phoenix IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Phoenix area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
310	1.	Diseases of the heart	120	133.0	135.1	1.0
790	2.	Accidents/adverse effects	87	78.9	20.4	3.9
150	3.	Malignant neoplasms	58	66.4	108.6	0.6
620	4.	Liver disease/cirrhosis	54	60.5	7.4	8.2
260	5.	Diabetes mellitus	44	52.3	9.6	5.4
510	6.	Pneumonia/influenza	33	31.7	9.2	3.5
430	7.	Cerebrovascular diseases	27	29.2	35.4	0.8
830	8.	Homicide	20	18.3	4.3	4.2
640	9.	Nephritis, et al	17	20.7	3.6	5.7
740	10.	Conditions arising in perinatal period	15	10.0	8.2	1.2
820	11.	Suicide	14	10.7	5.7	1.9
730	12.	Congenital anomalies	12	9.5	5.5	1.7
090	13.	Septicemia	6	5.7	2.4	2.4
480	14.	Atherosclerosis	5	3.8	4.6	0.8
490	15.	Other arterial disease	5	5.7	3.0	1.9
		All others	128	126.5	57.4	2.2
ALL	....	All causes	645	662.9	420.4	1.6
Males:						
790	1.	Accidents/adverse effects	225	227.2	60.2	3.8
310	2.	Diseases of the heart	117	229.4	271.2	0.8
620	3.	Liver disease/cirrhosis	96	116.9	16.0	7.3
150	4.	Malignant neoplasms	65	87.1	163.7	0.5
830	5.	Homicide	58	53.5	16.7	3.2
820	6.	Suicide	55	46.2	18.0	2.6
510	7.	Pneumonia/influenza	50	52.6	16.6	3.2
430	8.	Cerebrovascular diseases	35	40.0	41.7	1.0
260	9.	Diabetes mellitus	28	37.5	10.0	3.8
640	10.	Nephritis, et al	18	22.5	5.6	4.0
740	11.	Conditions arising in perinatal period	14	9.4	10.3	0.9
090	12.	Septicemia	9	11.3	3.4	3.3
540	13.	Chronic pulmonary diseases	9	10.8	26.2	0.4
730	14.	Congenital anomalies	8	5.8	6.1	1.0
840	15.	All other external causes	8	6.8	2.2	3.1
		All others	271	244.6	85.4	2.9
ALL	....	All causes	1,066	1,201.6	753.3	1.6

[a] Equivalence to ICD-9 code available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

more than 12 times the rate in U.S. short-stay non-Federal hospitals, and Phoenix area hospitalization rates for alcohol-related mental disorders also exceeded the rates in U.S. short-stay non-Federal hospitals.

Portland Area

Judging from changes in crude mortality rates, the Portland area, which in 1984 served 96,427 Indians in the reservation States of Washington, Oregon, and Idaho, has experienced the most dramatic improvement in health status of the IHS areas. On all of the 10 leading causes of death in the 3-year period centered in 1973, there had been at least a 37-percent decline in the crude mortality rate by 1980 to 1982, including diseases of the heart, malignant neoplasms, and suicide, which sometimes rose or showed no improvement in other IHS areas (see table 4-52). However, the changing composition of the Portland service area (179,166) should be taken into account when comparing mortality rates over time. The population of the Portland area increased by almost 300 percent in the decade between 1972 and 1982 (see table 4-3 and 4-4). The mortality rate (adjusted for

Table 4-51.—Fifteen Most Frequent Outpatient Diagnoses:[a] Phoenix Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	080	Diabetes mellitus	19,514	7.5
2.	480	Prenatal care	17,521	6.7
3.	300	Upper respiratory infection, common cold	14,289	5.5
4.	819	Other preventive health services	11,932	4.6
5.	250	Acute otitis media	10,508	4.0
6.	283	Hypertensive disease	8,409	3.2
7.	818	Well child care	8,259	3.2
8.	210	Refractive error	7,050	2.7
9.	305	Respiratory allergy, asthma and hay fever	6,348	2.4
10.	823	Tests only (lab, X-ray)	6,169	2.4
11.	400	Urinary tract infection	5,906	2.3
12.	575	Other muskuloskeletal, connective tissue diseases	4,908	1.9
13.	821	Physical examination	4,288	1.6
14.	014	Gastroenteritis, diarrhea, etc., no other symptoms	4,195	1.6
15.	827	All other	5,974	2.3
Male:				
1.	300	Upper respiratory infection, common cold	10,806	6.3
2.	080	Diabetes mellitus	10,566	6.2
3.	250	Acute otitis media	10,419	6.1
4.	818	Well child care	8,022	4.7
5.	730	Laceration, open wound	7,107	4.1
6.	283	Hypertensive disease	7,081	4.1
7.	819	Other preventive health services	6,426	3.7
8.	821	Physical examination	4,323	2.5
9.	305	Respiratory allergy, asthma, and hay fever	4,293	2.5
10.	702	Dislocations, sprains, and strains	3,854	2.2
11.	210	Refractive error	3,727	2.2
12.	731	Supericial injury, contusion	3,698	2.2
13.	575	Other muskuloskeletal, connective tissue diseases	3,656	2.1
14.	701	Fracture of extremity	3,595	2.1
15.	014	Gastroenteritis, diarrhea, etc., no other symptoms	3,538	2.1
		All other causes, both sexes	219,389	
	ALL	All causes, both sexes	445,770	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Phoenix total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

age) in the Portland area in 1980 to 1982 remained significantly above that of U.S. all races: 749.8 per 100,000 population compared to the U.S. all races rate for 1981 of 568.2, for a ratio of 1.3 (1.4 for females and 1.2 for males; table 4-53).

As in most other IHS areas, the leading causes of death among Portland males were from accidents, particularly motor vehicle accidents. Liver disease, suicide, and homicide death rates also exceeded the U.S. all races rates for males. Although deaths from diseases of the heart took more female lives than did the social causes, the accident mortality rate for females still was 3.7 times the U.S. all races female rate, and the liver disease mortality rate exceeded the U.S. all races female rate by almost 9 times.

Because of the way medical care is provided in the Portland area, hospitalization and outpatient data are almost impossible to use as indicators of morbidity and mortality. Portland has no direct care hospital, so all inpatient care must be purchased through contract care, which has been severely restricted in recent years (see ch. 6). Thus, although Portland experienced a high death rate from violent causes in 1980 to 1981, the hospital discharge rate for injuries and poisonings was almost the lowest of the IHS areas in 1984. In 1979, the number of discharges for injuries and

Table 4-52.—Changes in Crude Death Rates, 1972-82: IHS Portland Area (rates per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82[a]
790	Accidents/adverse effects	254.5	163.8	117.6	−53.8
800	Motor vehicle accidents	152.0	104.6	71.5	−53.0
810	All other accidents	102.4	59.1	46.1	−55.0
310	Diseases of the heart	219.2	155.6	116.7	−46.8
620	Liver disease/cirrhosis	121.2	78.2	50.8	−58.1
150	Malignant neoplasms	79.3	61.8	49.5	−37.6
430	Cerebrovascular diseases	73.8	35.4	28.4	−61.5
510	Pneumonia/influenza	59.5	40.9	16.8	−71.8
820	Suicide	39.6	32.7	22.0	−44.5
740	Conditions arising in perinatal period	35.2	25.4	15.5	−56.0
830	Homicide	34.1	16.3	15.5	−54.5
260	Diabetes mellitus	29.7	12.7	16.8	−43.5
	All other causes	268.2	170.0	137.3	−48.8
ALL	All causes	1,214.3	792.8	586.9	−51.7

[a] May be invalid due to changes in population covered.

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977*, DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1986.

poisonings (166 discharges) was greater than in 1984, even though the Portland area population was 27 percent lower in 1979 than in 1984. This situation is characteristic of the Portland area in general: the total number of hospital discharges was 4,210 in 1979 and 4,222 in 1984, which, when adjusted for the rise in population, was a substantial decline. The 1984 proportion of outpatient visits for trauma was more consistent with Portland's mortality rate from those causes relative to other IHS areas: of the 15 leading reasons for outpatient visits among males, lacerations and open wounds accounted for 1.9 percent; and dislocations, sprains, and strains accounted for another 1.8 percent (see table 4-54).

Although more males than females in the Portland area died from diabetes in 1980 to 1982, the female death rate from renal failure was considerably worse than the male death rate. It is also noteworthy that refractive error was not among the leading causes of outpatient visits for either males or females, reportedly an effect of the limitation on contract care expenditures.

Although cardiovascular diseases and malignant neoplasms were leading causes of death for Portland area males and females, deaths from these causes did not exceed the U.S. all races rates. As was typical of IHS areas, however, hypertensive disease was one of the five leading causes of outpatient visits for males and females in the Portland area.

The infant mortality rate in 1980 to 1982 was 16.9 per 1,000 live births, compared to the 1981 U.S. all races rate of 11.9. Causes of mortality varied, although for neonates, a large portion was attributable to respiratory distress (see table 4-55). The Portland 1980 to 1982 mortality rate for SIDS, the leading cause of death among postneonates, was the worst of the IHS areas (see figure 4-16). It is noteworthy that outpatient visits for prenatal care, usually one of the five leading reasons for female encounters (194), was the 15th leading reason in Portland, accounting for 2,400 visits, or 1.7 percent. However, many pregnancies in the Portland area are apparently referred out of the IHS system because obstetricians are not available. IHS records show that in 1984 an additional 576 visits for prenatal care were made to non-IHS facilities, but not all non-IHS visits are coded and recorded for diagnosis, so it is impossible to estimate the amount of prenatal care given in the Portland area.

The high infant mortality rate may be related to a high rate of alcohol abuse among Portland

Table 4-53.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Portland IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Portland area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
310	1.	Diseases of the heart	113	129.7	135.1	1.0
790	2.	Accidents/adverse effects	84	76.1	20.4	3.7
150	3.	Malignant neoplasm	56	67.6	108.6	0.6
620	4.	Liver disease/cirrhosis	55	64.5	7.4	8.7
430	5.	Cerebrovascular diseases	34	39.1	35.4	1.1
510	6.	Pneumonia/influenza	20	20.6	9.2	2.2
260	7.	Diabetes mellitus	15	17.8	9.6	1.9
640	8.	Nephritis, et al	14	16.5	3.6	4.6
830	9.	Homicide	14	13.8	4.3	3.2
740	10.	Conditions arising in perinatal period	12	8.0	8.2	1.0
820	11.	Suicide	8	6.1	5.7	1.1
540	12.	Chronic pulmonary diseases	7	7.7	9.5	0.8
090	13.	Septicemia	6	7.0	2.4	2.9
730	14.	Cogenital anomalies	6	4.0	5.5	0.7
420	15.	Hypertension with or without renal disease	4	4.4	1.7	2.6
		All others	102	105.7	53.8	2.0
ALL	....	All causes	550	588.6	420.4	1.4
Males:						
790	1.	Accidents/adverse effects	189	176.2	60.2	2.9
310	2.	Diseases of the heart	158	215.5	271.2	0.8
620	3.	Liver disease/cirrhosis	63	79.2	16.0	5.0
150	4.	Malignant neoplasms	59	80.7	163.7	0.5
820	5.	Suicide	43	36.4	18.0	2.0
430	6.	Cerebrovascular diseases	32	41.2	41.7	1.0
260	7.	Diabetes mellitus	24	31.7	10.0	3.2
740	8.	Conditions arising in perinatal period	24	15.8	10.3	1.5
830	9.	Homicide	22	20.5	16.7	1.2
510	10.	Pneumonia/influenza	19	23.6	16.6	1.4
540	11.	Chronic pulmonary diseases	13	18.3	26.2	0.7
730	12.	Congenital anomalies	10	7.5	6.1	1.2
840	13.	All other external causes	7	8.4	2.2	3.8
640	14.	Nephritis, et al	5	6.5	5.6	1.2
090	15.	Septicemia	4	4.9	3.4	1.4
		All others	141	154.8	85.4	1.8
ALL	....	All causes	813	921.2	753.3	1.2

[a] Equivalence to ICD-9 code available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

area females, a hypothesis which is supported by anecdotal reports to OTA of alcohol abuse in the Portland area, and by vital statistics data indicating that the 1980 to 1982 Portland area female death rate from liver disease and cirrhosis was 8.7 times the U.S. all races rate for females. The liver disease and cirrhosis rate was also markedly high among Portland males. Liver disease and cirrhosis was the third leading cause of death among Portland area males, accounting for 63 deaths in 1980 to 1982, a rate 5 times that of U.S. all races males. Another indication of the prevalence of alcohol abuse in the Portland area was the hospital discharge rate of 1.3 per 10,000 population for alcoholic liver disease, which was comparable to the rate in U.S. short-stay non-Federal hospitals of 1.6 despite the overall decline in hospitalizations in Portland. However, hospital discharge rates for alcohol dependence syndrome and alcoholic psychoses were lower in Portland than in U.S. short-stay non-Federal hospitals and have declined markedly from 1979 (166). No mental disorders of any kind, including those related to alcohol abuse, were among the 15 leading causes of outpatient visits in 1984, although they were among the leading causes of visits in several serv-

Table 4-54.—Fifteen Most Frequent Outpatient Diagnoses:[a] Portland Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	300	Upper respiratory infection, common cold	13,232	9.5
2.	819	Other preventive health services	9,757	7.0
3.	080	Diabetes mellitus	5,978	4.3
4.	283	Hypertensive disease	5,492	3.9
5.	250	Acute otitis media	4,974	3.6
6.	823	Tests only (lab, X-ray)	4,592	3.3
7.	818	Well child care	4,066	2.9
8.	305	Respiratory allergy, asthma, and hay fever	3,811	2.7
9.	575	Other musculoskeletal, connective tissue disease	2,952	2.1
10.	510	Eczema, urticaria, or skin allergy	2,814	2.0
11.	812	Other ill-defined, undiagnosed disease	2,715	2.0
12.	821	Physical examination	2,680	1.9
13.	550	Rheumatoid arthritis	2,666	1.9
14.	480	Prenatal care	2,400	1.7
15.	827	All other	4,025	2.9
Male:				
1.	300	Upper respiratory infection, common cold	9,266	10.2
2.	819	Other preventive health services	5,349	5.9
3.	250	Acute otitis media	4,812	5.3
4.	283	Hypertensive disease	4,512	5.0
5.	818	Well child care	3,839	4.2
6.	080	Diabetes mellitus	3,617	4.0
7.	823	Tests only (lab, X-ray)	2,517	2.8
8.	821	Physical examination	2,313	2.5
9.	305	Respiratory allergy, asthma, and hay fever	2,310	2.5
10.	575	Other musculoskeletal, connective tissue diseass	1,897	2.1
11.	730	Laceration, open wound	1,713	1.9
12.	510	Eczema, urticaria, or skin allergy	1,632	1.8
13.	702	Dislocations, sprains, and strains	1,598	1.8
14.	812	Other ill-defined, undiagnosed diseases	1,591	1.8
15.	827	All other	2,776	3.1
		All other causes, both sexes	114,028	
	ALL	All causes, both sexes	235,924	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Portland total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

ice units. These figures do not, however, include the facilities which are funded under Self-Determination legislation and by Portland area Indian tribes (76).

Certain other problems that do not appear as underlying causes of death have been noted as particular problems in the Portland area. Besides the usual high number of outpatient encounters for otitis media and diabetes, rheumatoid arthritis appears to be unusually prevalent in Portland area females. In 1984, this autoimmune disease accounted for 2,666, or 1.9 percent, of female visits in the Portland area on average. Another 2,952 female and 1,897 male visits were attributed to other musculoskeletal and connective tissue diseases. Thus, it seems particularly inconsistent for the hospital discharge rate for diseases of the musculoskeletal system to be 18.6 per 10,000 population, far lower than the U.S. short-stay non-Federal hospital average and the average in other IHS areas. Skin diseases, including eczema and urticaria, were also among the leading causes of outpatient visits in the Portland area, making it all the more surprising that the area had the lowest hospital discharge rate (8.7 per 10,000 population) for such diseases in 1984, declining from a rate of 14.3 in 1979.

In summary, Portland area Indians suffer from much the same diseases and risk factors for illness and injury that Indians in other IHS areas

Table 4-55.—Infant Deaths and Death Rates IHS Portland Area, 1980-82

IHS code[a]	Cause	Deaths			Rates (per 1,000 live births)		
		Total	Neonates	Postneonates	Total	Neonates	Postneonates
010	Intestinal infection	1	—	1	0.2	—	0.2
040	Septicemia	1	—	1	0.2	—	0.2
130	Meningitis	1	—	1	0.2	—	0.2
150	Acute URI	1	—	1	0.2	—	0.2
160	Bronchitis	1	—	1	0.2	—	0.2
170	Pneumonia/influenza	1	—	1	0.2	—	0.2
200	Other respiratory diseases	1	—	1	0.2	—	0.2
240	Congenital anomalies	14	9	5	2.2	1.4	0.8
380	Conditions arising in perinatal period	36	36	—	5.6	5.6	—
500	Respiratory distress	11	11	—	1.7	1.7	—
580	Symptoms/signs/other	44	—	44	6.9	—	6.9
590	SIDS	43	—	43	6.7	—	6.7
600	Symptoms/signs/other	1	—	1	0.2	—	0.2
610	Accidents/adverse effects	1	—	1	0.2	—	0.2
680	All other causes	2	1	1	0.3	0.2	0.2
ALL	All	104	46	58	16.9[b]	7.2	9.7[b]

[a] IHS code, equivalence to ICD-9 Recode 61 for infant deaths available from IHS.

[b] Will not total due to rounding error.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

do. Accidents, diabetes, and liver disease can be said to be epidemic among Portland area Indians, and in 1980 to 1982 the postneonatal mortality rate was the highest of IHS areas. In addition, Portland area Indians appear to suffer disproportionately from skin diseases and rheumatoid arthritis. Health status data indicate that restrictions on contract care funds may be affecting the availability of health services to Portland area Indians.

Tucson Area

The IHS Tucson area is located in South Central Arizona. It is the smallest of the IHS areas, with a service population estimated to be 17,852 in 1984.

As in all IHS areas, the crude death rate in Tucson declined in the decade between 1972 and 1982, although not as much as in IHS areas in total (see table 4-56). In the 3-year period centered in 1973, Tucson had the fourth highest death rate of the IHS areas; in 1980 to 1982 it had the third highest. The poor health status of Tucson Indians is also apparent from an estimated age-adjusted mortality rate of 1011.1 per 100,000 population in the 3-year period centered in 1981, a rate 1.8 times the U.S. all races rate.

Accidents remained the leading cause of death in Tucson in 1980 to 1982 (see table 4-57), despite a 27-percent decline in the death rate from accidents since 1972 to 1974. Forty-two Tucson males died as a result of accidents in 1980 to 1982, a rate 3.7 times that of U.S. all races males. Though the number of Tucson females killed in accidents (19 deaths) was lower, accidents were the second leading cause of death for females, and their rate of death from accidents was 3.6 times the rate for U.S. all races females. Other forms of violent death were also prevalent in Tucson, particularly among males. Suicide was the fifth leading cause of death for males, and homicide, the eighth. Injuries and poisonings were the second leading cause of hospitalization in Tucson in both 1979 and 1984, although neither the 1979 or 1984 discharge rates for injuries and poisonings exceeded either the IHS or the U.S. all races averages. As for many other IHS areas, lacerations and open wounds, and superficial injuries and contusions were among the 15 leading causes of male outpatient visits in Tucson, accounting for a total of 5 percent of male visits (see table 4-58).

Heart disease was the leading cause of death for Tucson females, and Tucson is unusual in that the 1980 to 1982 mortality rate from heart disease for females exceeded that of U.S. all races females (by a ratio of 1.3).

The 1980 to 1982 infant mortality rate in Tucson was the second highest of IHS areas and 1.6

Table 4-56.—Changes in Crude Death Rates, 1972-82: IHS Tucson Area (rates per 100,000 population)

IHS Code	Cause	1972-74 rate	1975-77 rate	1980-82 rate	Percent change 1972-82
790	Accidents/adverse effects	168.1	166.1	122.5	−27.1
800	Motor vehicle accidents	114.0	124.6	90.4	−20.7
810	All other accidents	54.1	41.5	32.1	−40.6
620	Liver disease/cirrhosis	82.6	80.6	52.2	−36.8
310	Diseases of the heart	71.2	83.0	114.5	60.8
150	Malignant neoplasms	62.7	70.8	44.2	−29.5
510	Pneumonia/influenza	54.1	31.7	28.1	−48.0
260	Diabetes mellitus	42.7	19.5	36.1	−15.4
030	Tuberculosis	37.0		10.0	−72.9
430	Cerebrovascular diseases	31.3	24.4	18.1	−42.3
830	Homicide	31.3	19.5	20.1	−35.8
820	Suicide	22.8	26.8	38.2	67.3
	All other causes	315.7	318.3	271.0	−14.1
ALL	All causes	920.5	840.7[a]	755.0	−18.0

[a] Includes tuberculosis; rate unknown.

SOURCES: **1972-74 and 1975-77 deaths:** U.S. Department of Health, Education and Welfare, Public Health Service, Health Services Administration, Indian Health Service, *Selected Vital Statistics for Indian Health Service Areas and Service Units, 1972 to 1977,* DHEW Pub. No. (HSA)-79-1005 (Rockville, MD: HSA, 1979). **1972-74 and 1975-86 population:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, internal documents, Rockville, MD, 1985. **1980-82 data:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

times that of the U.S. all races rate. As for almost all other IHS areas, the neonatal mortality rate in Tucson (6.1 per 1,000 live births) was lower than that of U.S. all races (8.0), but Tucson's postneonatal mortality rate was 3.5 times that of U.S. all races and the highest of all IHS areas. Unfortunately, the cause or causes of this high mortality rate cannot be specified; the two largest categories of postneonatal death being SIDS (six deaths) and other "symptoms, signs and ill-defined conditions" (four postneonatal and one neonatal death; table 4-59).

Although the absolute numbers were small, as for most other causes of death, liver disease and cirrhosis caused death in Tucson females at a rate 5.5 times (8 deaths) the U.S. all races females rate, and Tucson males had a death rate 8.3 times (18 deaths) the U.S. all races male rate. The Tucson hospital discharge rate for alcoholic liver disease (9.0 per 10,000 population) was also higher than the comparable rate in U.S. short-stay non-Federal hospitals (1.6). The Tucson hospital discharge rates for alcohol-related mental disorders relative to that of U.S. short-stay non-Federal hospitals varied and are difficult to interpret. There were higher rates of hospital discharges for both nondependent alcohol abuse and alcoholic psychoses in Tucson than in U.S. short-stay non-Federal hospitals, but a lower rate in Tucson for alcohol dependence syndrome (9.5 per 10,000 population for alcohol dependence syndrome compared to a rate of 16.7 for U.S. short-stay non-Federal hospitals). These statistics do not include data from the Papago tribe's alcohol program (funded under Public Law 93-638), which includes outpatient and residential treatment components (76). The Tucson discharge rate for mental disorders (38.1 per 10,000 population) was about half that of U.S. short-stay non-Federal hospitals (72.0), which is not surprising because there are no IHS psychiatric beds in the Tucson area. No mental disorders, including those for alcohol abuse, were among the 15 leading causes of outpatient visits in Tucson.

It is notable that in 1984 the Tucson hospital discharge rate for diabetes (53.2) was twice that of both the IHS on average and U.S. short-stay non-Federal hospitals. The Tucson rate in 1979 was 17.4 per 10,000 population, indicating perhaps that diabetes is a growing problem. Diabetes was also the leading cause of outpatient visits for females (8.0 percent of female visits) and the second leading cause of outpatient visits for males (6.9 percent of male visits). Changes in the crude death rate from diabetes (shown in table 4-30) are hard to interpret; apparently, low absolute numbers result in substantial variation year-by-year.

Table 4-57.—Fifteen Leading Causes of Deaths and Age-Adjusted Death Rates for Tucson IHS Area Indians 1980-82 and U.S. All Races 1981

IHS code[a]	Rank	Cause name	Number of deaths	Age-adjusted mortality rate		Ratio of Tucson area Indians to U.S. all races
				Indians	U.S. all races	
Females:						
310	1.	Diseases of the heart	29	173.6	135.1	1.3
790	2.	Accidents/adverse effects	19	74.2	20.4	3.6
260	3.	Diabetes mellitus	9	53.9	9.6	5.6
090	4.	Septicemia	8	45.9	2.4	19.1
620	5.	Liver disease/cirrhosis	8	40.7	7.4	5.5
150	6.	Malignant neoplasms	7	42.5	108.6	0.4
430	7.	Cerebrovascular diseases	6	38.3	35.4	1.1
510	8.	Pneumonia/influenza	5	20.2	9.2	2.2
420	9.	Hypertension with or without renal disease	4	20.9	1.7	12.3
820	10.	Suicide	4	15.2	5.7	2.7
140	11.	All other infectious/parasitic diseases	3	19.3	1.3	14.9
640	12.	Nephritis, et al	3	19.3	3.6	5.4
730	13.	Congenital anomalies	3	7.5	5.5	1.4
740	14.	Conditions arising in perinatal period	2	5.0	8.2	0.6
840	15.	All other external causes	2	7.6	0.9	8.5
		All others	39	197.1	65.1	3.0
ALL	....	All causes	151	781.2	420.4	1.9
Males:						
790	1.	Accidents/adverse effects	42	222.5	60.2	3.7
310	2.	Diseases of the heart	28	169.9	271.2	0.6
620	3.	Liver disease/cirrhosis	18	132.2	16.0	8.3
150	4.	Malignant neoplasms	15	106.2	163.7	0.6
820	5.	Suicide	15	73.2	18.0	4.1
260	6.	Diabetes mellitus	9	55.5	10.0	5.6
510	7.	Pneumonia/influenza	9	45.0	16.6	2.7
830	8.	Homicide	9	43.8	16.7	2.6
030	9.	Tuberculosis	4	26.3	1.0	26.3
640	10.	Nephritis, et al	4	28.0	5.6	5.0
420	11.	Hypertension with or without renal disease	3	24.0	2.2	10.9
430	12.	Cerebrovascular disease	3	12.1	41.7	0.3
090	13.	Septicemia	2	7.5	3.4	2.2
540	14.	Chronic pulmonary diseases	2	9.9	26.2	0.4
730	15.	Congenital anomalies	2	5.0	6.1	0.8
		All others	60	311.7	94.7	3.3
ALL	....	All causes	225	1,272.8	753.3	1.7

[a] Equivalence to ICD-9 code available from the Indian Health Service.

SOURCES: **U.S. all races:** U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report, Final Mortality Statistics, 1981," *Monthly Vital Statistics Report* 33(3):supp., June 22, 1984; **Indians in IHS areas:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

In the 1980-82 period, relatively few (only six) Indian residents in Tucson died of renal failure, another common sequelae of diabetes, but this is not surprising if the problem is emerging only relatively recently, as suggested by the hospital discharge data.

There are other health problems in Tucson that are not evident from mortality data. As shown in table 4-32, otitis media accounted for 4.8 percent of outpatient visits among males, and 3.0 percent among females, although this rate was not unusually high for IHS areas. Urinary tract infections accounted for a substantial portion of outpatient visits by females, and hypertensive disease also seemed to be common in both sexes. The Tucson area did seem to be unusual in having relatively large numbers of outpatient visits for skin diseases, including bacterial infection, fungal diseases, and "other diseases of the skin," amounting to 6.2 percent of male, and 4.7 percent of female visits. These skin diseases were not among the leading causes of visits to physicians' offices in the last survey of ambulatory medical care in the United States (200). Hospital discharge rates for skin diseases in Tucson (31.4 per 10,000 pop-

Table 4-58.—Fifteen Most Frequent Outpatient Diagnoses:[a] Tucson Area, Fiscal Year 1984

Rank	IHS Code	Clinical impressions	Number of visits	Percent of total visits by sex
Female:				
1.	080	Diabetes mellitus	3,889	8.0
2.	480	Prenatal care	3,726	7.7
3.	300	Upper respiratory infection, common cold	2,653	5.5
4.	251	Chronic otitis media with or without mastoiditis	1,472	3.0
5.	283	Hypertensive disease	1,422	2.9
6.	823	Tests only (lab, X-ray)	1,412	2.9
7.	520	Other diseases of skin	1,363	2.8
8.	820	Hospital medical/surgical followup	1,339	2.8
9.	486	Other complications of pregnancy	940	1.9
10.	504	Fungal diseases	921	1.9
11.	400	Urinary tract infection	913	1.9
12.	818	Well child care	909	1.9
13.	810	All other symptoms	905	1.9
14.	819	Other preventive health services	837	1.7
15.	827	All other	4,637	9.6
Male:				
1.	300	Upper respiratory infection, common cold	2,082	7.1
2.	080	Diabetes mellitus	2,026	6.9
3.	251	Chronic otitis media with or without mastoiditis	1,408	4.8
4.	283	Hypertensive disease	1,283	4.4
5.	820	Hospital medical/surgical followup	1,100	3.7
6.	818	Well child care	922	3.1
7.	520	Other diseases of skin	776	2.6
8.	730	Laceration, open wound	762	2.6
9.	731	Superficial injury, contusion	700	2.4
10.	810	All other symptoms	683	2.3
11.	821	Physical examination	597	2.0
12.	014	Gastroenteritis, diarrhea, etc., no other symptoms	583	2.0
13.	501	Other bacterial infections of skin	532	1.8
14.	504	Fungal diseases	530	1.8
15.	827	All other	2,429	8.2
		All other causes, both sexes	34,615	
	ALL	All causes, both sexes	78,366	100.0

[a] IHS refers to these as clinical impressions, because they are recorded before a clinical diagnosis is completed; therefore, they may not be valid diagnoses.

SOURCES: **15 leading clinical impressions:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Special Report on 15 Leading Causes of Outpatient Care By Area and Service Unit, State and County," internal document, Albuquerque, NM, 1985. **Tucson total:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation and Legislation, Program Statistics Branch, *Summary of Leading Causes for Outpatient Visits, Indian Health Service Facilities, Fiscal Year 1984* (Rockville, MD: IHS, no date).

ulation) were higher than the U.S. races and IHS average rates, although other IHS areas experienced even higher rates.

Although gastrointestinal infections are no longer a leading cause of death among Indians, gastroenteritis and/or diarrhea were among the leading causes of outpatient visits among Tucson males, and the hospital discharge rate for infectious and parasitic diseases was the second highest of IHS areas, second only to the Phoenix area. Skin and other infectious diseases are due at least in part to the lack of indoor plumbing (145).

In summary, the health status of Indians in the Tucson area is in many respects similar to that of Indians elsewhere in the United States, although there are certain problems such as gastroenteritis, skin diseases, and other infectious diseases that patient care and mortality data indicate are more prevalent among Indians in the Tucson area than elsewhere. With the small population, and resulting small absolute number of deaths, interpretations about change and relative importance are sometimes difficult to make.

Table 4-59.—Infant Deaths and Death Rates IHS Tucson Area, 1980-82

IHS code[a]	Cause	Deaths			Rates (per 1,000 live births)		
		Total	Neonates	Postneonates	Total	Neonates	Postneonates
040	Septicemia	1	—	1	0.7	—	0.7
130	Meningitis	1	—	1	0.7	—	0.7
170	Pneumonia/influenza	2	2	—	1.3	1.3	—
180	Pneumonia	2	2	—	1.3	1.3	—
220	Gastritis, etc.	2	—	2	1.3	—	1.3
230	Other digestive	1	—	1	0.7	—	0.7
240	Congenital anomalies	5	4	1	3.4	2.7	0.7
380	Conditions arising in perinatal period	4	2	2	2.7	1.3	1.3
580	Symptoms/signs/other	11	1	10	7.4	0.7	6.7
590	SIDS	6	—	6	4.0	—	4.0
600	Symptoms/signs/other	5	1	4	3.4	0.7	2.7
640	Accidents	1	—	1	0.7	—	0.7
680	All other causes	1	—	1	0.7	—	0.7
ALL	All	29	9	20	19.5	6.1	13.3

[a] IHS code, equivalence to ICD-9 Recode 61 for infant deaths available from IHS.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985.

CONCLUSION

In conclusion, the health of American Indians on average has improved on many measures over the past 15 years, but in almost every IHS service area and on almost every measure it is still far behind that of the U.S. all races population. There is considerable variation among IHS areas, but the available mortality data indicate that Indians in almost all IHS service areas are at considerable risk for death by accident, suicide, homicide, and other external or "social" causes. In addition, they suffer disproportionately from alcoholism, diabetes, and pneumonia. Infant mortality has declined, but Indian infants continue to be at greater risk for death than infants of all other U.S. races combined, particularly in the postneonatal period. Comprehensive data about illness in Indians are difficult to obtain because of IHS's position that it is not the sole provider of health care to Indians, but for the most part available data support the conclusions drawn from mortality data and indicates the existence of additional problems.

Chapter 5

The Indian Health Service

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Chapter 5

The Indian Health Service

INTRODUCTION

The primary source of health care services delivered to most American Indians is the Indian Health Service (IHS) of the Public Health Service (PHS), U.S. Department of Health and Human Services (DHHS). The involvement of other Federal, State, and local public health programs and private providers is significantly less, and in fact the extent to which Indians depend on these other sources of care is not precisely known.

Federal responsibility for the provision of health care to American Indians and Alaska Natives under the Snyder Act of 1921 (25 U.S.C. 13) was conveyed from the Bureau of Indian Affairs (BIA) in the Department of the Interior to the Department of Health, Education, and Welfare (now DHHS) by the Transfer Act of August 5, 1954 (42 U.S.C. 2001 *et seq.*). Under that law, IHS came into being on July 1, 1955. The early focus of IHS was on elimination of the infectious diseases that were widespread in the Indian population and on chronic care for the large numbers of Indians suffering from tuberculosis. IHS achieved marked success in both of those areas.

The present mission of IHS, articulated most clearly in the Indian Health Care Improvement Act of 1976 (Public Law 94-437), is to raise the health status of American Indians and Alaska Natives to the highest possible level. IHS defines its service delivery responsibilities to include a comprehensive range of inpatient and ambulatory medical services, dental care, mental health and alcoholism services, preventive health (immunizations and environmental services such as sanitation and water safety), health education, and Indian health manpower development programs. For Indians who live in isolated rural areas on or near reservations, a broad definition of IHS responsibilities is justified, because the infrastructure of roads, utilities, and public services that support health care delivery to non-Indian rural residents often is lacking on Indian reservations. IHS also includes a health facilities construction component that focuses its activities on providing hospitals, clinics, and facility staff living quarters for reservation-based IHS services. IHS-funded programs for Indians who live in urban areas, on the other hand, do not directly provide hospital care; but they do offer a range of ambulatory medical, dental, mental health, social support, and referral services.

IHS provides comprehensive health and health-related services to approximately 960,000 eligible Indians (1985) who live on or near reservations at no cost to the individual Indian, regardless of other health insurance coverage or ability to pay. Both the comprehensiveness of the services IHS provides and the absence of premiums and user charges for these services set Indians apart from the general population in terms of their health care delivery expectations and problems. Thus, it is difficult to directly compare health services systems for Indians and the U.S. population. Non-Indians do not enjoy the preventive and health-related services available to Indians, and as a rule, they cannot receive such services free of charge. But with private health insurance, non-Indians have easier access to more technologically advanced medical services than are available to Indians dependent solely on IHS.

Although in principle IHS services are comprehensive and readily available at no user cost, in fact they are limited by IHS budget constraints and by the uneven distribution of services among IHS areas that has developed over the years. IHS facilities, for example, are not equally available and accessible to eligible populations in all parts of the country; and facilities construction plans are not necessarily related to local service population size or utilization patterns. The services offered by many of the smaller IHS hospitals may be less specialized than those found in the typical small rural community hospital. When no IHS facility is accessible or when specific services are not available from IHS facilities, Indian patients may require referral to private providers under the IHS contract care program; but contract care budgets sometimes have been so limited that needed referrals cannot be made. Thus, while they may not be directly affected by ability to pay, Indians may face serious obstacles in obtaining health care services through IHS.

IHS provides inpatient and ambulatory medical, dental, and mental health services either directly through its network of IHS-owned hospitals, health centers, and clinics, or indirectly, by purchasing services that are not available from IHS facilities through contracts with private providers. Another factor in the IHS delivery system since the Indian Self-Determination and Education Assistance Act of 1975 (Public Law 93-638) has been the operation of health facilities and service programs by Indian tribes. Direct care facilities, contract care programs, facilities construction, and special programs such as community health representatives, mental health and drug abuse, and health education initiatives may be administered by tribes under self-determination or 638 contracts. Most of these services, like IHS's own services, are reservation based; they are authorized and funded under the general authority of the Snyder Act; and they are provided to IHS-eligible Indians at no cost to the individual.

The urban Indian health projects, which are specifically authorized and funded under the Indian Health Care Improvement Act, operate separately from the reservation-based IHS system. Urban projects may receive funds from non-IHS sources, are likely to treat non-Indians, and may request payment from Indians and non-Indians alike based on a sliding fee scale. Although urban projects may not be operated by tribes under the self-determination program, they are similar to tribally operated programs in that they are more active than IHS programs in treating and billing non-Indians and in coordinating their efforts with other non-IHS health delivery programs.

The IHS direct care program, the IHS contract health services or contract care program, urban Indian health projects, and the IHS facilities construction program are described in this chapter.

THE IHS DIRECT CARE PROGRAM

Although the IHS direct care program also provides preventive health, dental, mental health, and alcoholism services, this discussion of the program focuses on hospital-based and ambulatory medical services, since they are by far the most important components of IHS services delivery. IHS direct care services to Indians living on or near reservations are delivered by Federal staff in IHS-owned and operated facilities, or by employees of tribal self-determination (638) contractors in IHS-owned, tribally operated facilities. As discussed in chapter 6, the 638 contract program implements the 1975 Indian Self-Determination and Education Assistance Act (Public Law 93-638). Hospitals and clinics operated under the self-determination program are considered part of the IHS direct care system, as opposed to the supplemental services that are obtained through the IHS contract care program; but tribes also may operate their own contract care programs under 638 contracts. Utilization data for tribally operated programs are incomplete because of differences in reporting systems.

Eligibility for Direct Care Services

Eligibility for direct services in IHS and tribally operated facilities is defined in Federal regulations (42 CFR 36 subpart B). The regulations state that medically indicated services will be provided "to persons of Indian descent belonging to the Indian community served by the local facilities and program." An individual may be considered eligible for IHS care "if he is regarded as an Indian by the community in which he lives as evidenced by such factors as tribal membership, enrollment, residence on tax-exempt land, ownership of restricted property, active participation in tribal affairs, or other relevant factors in keeping with general Bureau of Indian Affairs practices in the jurisdiction" (42 CFR 36.12). Non-Indian women pregnant with an eligible Indian's child may receive obstetrical care, and services to prevent the spread of infectious diseases may be provided to Indian and non-Indian members of the community.

These regulations allow broad interpretation of eligibility for IHS direct care, with notable variations among IHS areas. (Eligibility for contract care services is more restrictive because of the required residence "on or near" a reservation.) The Federal Government limits its responsibility for health services to Indians, however, by stating in regulations that IHS does not provide the same services in all areas and that service availability depends on the capabilities of local IHS and other providers and on the "financial and personnel resources" of IHS. If funds, facilities, or personnel are insufficient to meet demand, IHS may set priorities for care on the basis of relative medical need and access to other services (42 CFR 36.11 (c)).

Differences by IHS area between the numbers of Indians who are eligible for IHS direct care services and those who actually use them are unknown at this time. A patient enrollment system was instituted throughout IHS beginning in January 1984, and when this system is fully implemented, user populations will be defined more accurately. In the meantime, analyses of IHS service utilization rates and trends among the areas and comparisons with general U.S. rates should be viewed with caution, because the comparability of the denominator populations is not known. The uneven availability of IHS direct care facilities also has a significant, though unquantifiable, effect on services utilization.

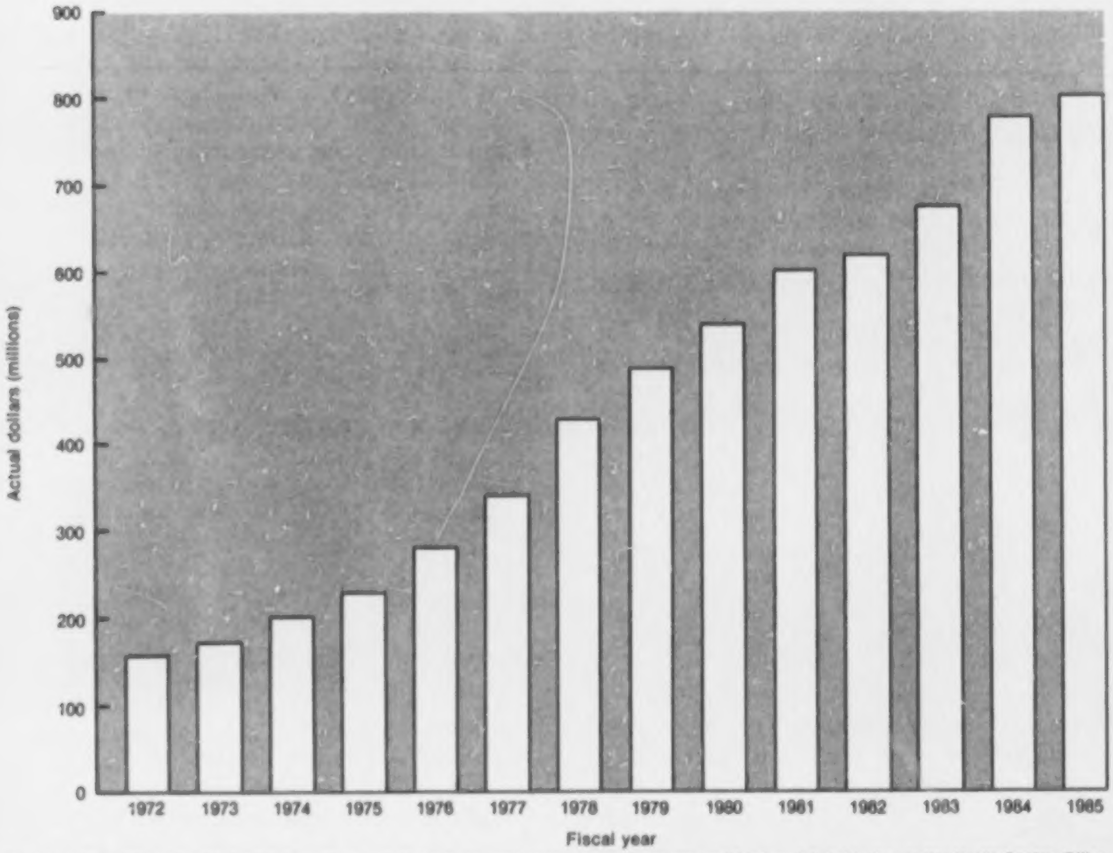
Funding for Direct Care Services

IHS funding for direct care services comes from the basic Snyder Act appropriation. Most of the additional funding appropriated for the Indian Health Care Improvement Act, authorized in fiscal years 1985 and 1986 by continuing resolution, is directed to particular programs such as manpower training, the community health representatives program, and urban Indian projects. That funding amounted to $129 million in fiscal year 1984, or 15 percent of the total IHS appropriation (135). Growth in overall IHS allocations, including Indian Health Care Improvement Act funding but not including IHS facility construction funds, is illustrated in figure 5-1 (for allocations by budget category and area for fiscal years 1972-85, refer to app. C). In actual dollars, IHS allocations increased from $157 million in fiscal year 1972 to $807 million in 1985. During that time, the IHS eligible service population doubled, more as a result of adding new population groups, such as the California Indians, than of natural increase. Consequently, annual allocations per IHS beneficiary have remained essentially the same since 1972 when adjusted for inflation (see ch. 1, figures 1-8 and 1-9).

Direct clinical services delivery has always been the major component of the IHS budget, averaging over 60 percent of total funding in recent years (see figure 5-2). Budgets for contract care services, preventive health programs, and other services (urban projects, manpower training, administration) are much smaller. Figure 5-3 illustrates the relative importance of these major budget components by IHS area and compares area funding levels for fiscal years 1981 and 1985.

Within the IHS direct care budget (excluding contract care), line items for hospital and clinic operations, facility maintenance and repairs, dental care, mental health, and alcoholism programs are specified (the reimbursements category refers not to Medicare and Medicaid collections, but to payments from other Federal agencies for the use of IHS facilities and services). Table 5-1 presents the breakdown of fiscal year 1985 direct health allocations by IHS area into these categories. The operation of IHS hospitals and clinics always has consumed the bulk of the direct services budget, representing 84 percent of the overall IHS direct delivery allocation in 1985. Hospitals and clinics funding ranged from a low of 67 percent of the total in the Portland IHS area to a high of 88 percent in Alaska. Dental care and alcohol programs each accounted for about 5 percent of the direct care budget (although funding for alcohol programs ranged from 2 percent in Alaska to nearly 19 percent in Portland in 1985), with lesser amounts allocated to mental health and facility maintenance and repair.

Figure 5-1.—IHS Annual Allocations, Fiscal Years 1972-85



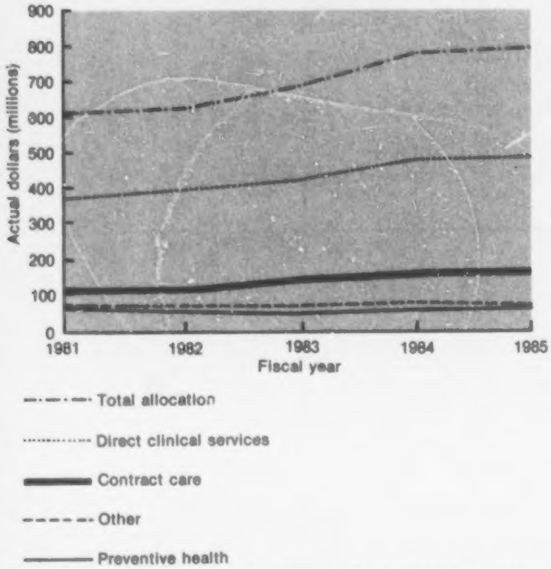
SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Administration and Management, 1985.

IHS Staffing

Personnel represents the largest single cost component in the IHS hospitals and clinics operating budget. Fiscal year 1984 IHS staff by area and by type of staff are shown in table 5-2. These figures include staff of IHS-operated direct care facilities and IHS employees assigned to tribally operated 638 contract programs under the terms of the Intergovernmental Personnel Act; but staff hired directly by the tribes are not included. Altogether, there were 10,342 permanent, full-time positions, nearly half of which were classified as administrative and support staff. The two categories of nurses in table 5-2 (including facility-based R.N.s and L.P.N.s, public health nurses, and nursing assistants) made up the largest group of health providers, accounting for nearly 27 percent of all positions. The 645 medical officers (excluding 44 who served primarily as administrators) made up 6.2 percent of total positions. Personnel data maintained at IHS headquarters do not identify medical officers by specialty; however, they do distinguish between medical officers in clinical practice and those engaged primarily in nonclinical work (171).

In 1984, the Navajo, Oklahoma, Phoenix, and Alaska areas had the largest numbers of IHS staff, a combined 62 percent of total IHS positions. The IHS system included 83 physician assistants, who were used most widely in the Navajo area. The largest numbers of medical officers in clinical prac-

Figure 5-2.—IHS Allocations by Category, Fiscal Years 1981-85



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Administration and Management, 1985.

tice were in the Navajo, Phoenix, Alaska, and Oklahoma areas (see table 5-2). This observation suggests that a wider and more advanced range of services is available in those areas. It also reflects the location of IHS's three referral medical centers in Anchorage, Gallup, and Phoenix, and of seven hospitals in the Oklahoma IHS area.

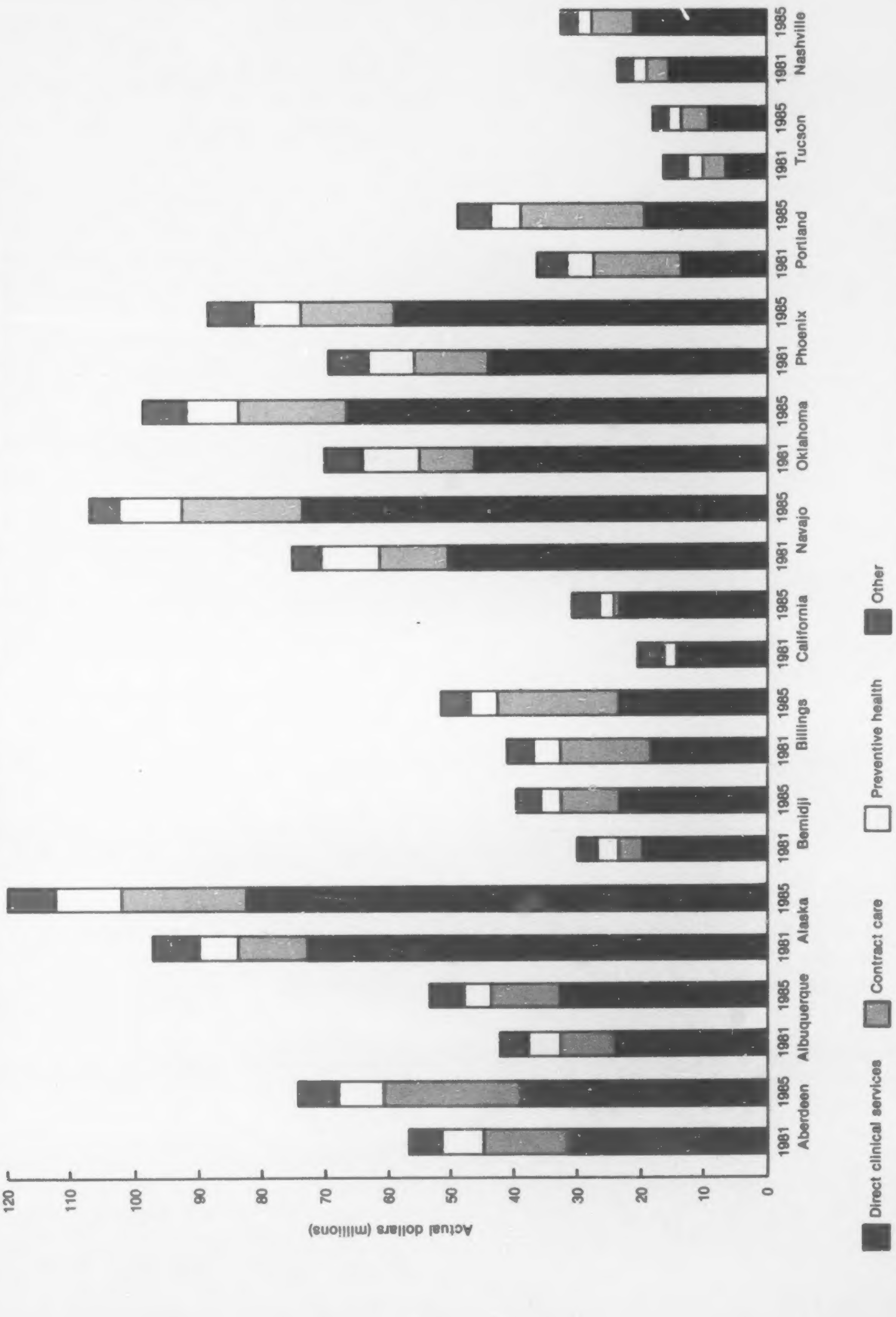
Indian preference in employment applies to initial appointments, reappointment, reinstatement, transfer, reassignment, promotion, or any other personnel action intended to fill a vacancy in IHS (42 CFR 36.42 (a)), BIA, or in tribal programs operated under self-determination (638) contracts. Preference in employment is extended to: 1) members of federally recognized tribes; 2) descendants of such members who were residing within the present boundaries of any Indian reservation on June 1, 1934; 3) persons of Indian descent who are of one-half or more Indian blood of tribes indigenous to the United States; 4) Eskimos and other aboriginal people of Alaska; and 5) certain descendants of the Osage tribe (42 CFR 36.41). Table 5-3 shows the fiscal year 1984 breakdown of Indian and non-Indian IHS employees by profession for each area. In 1984, 59.3 percent of the IHS work force was Indian, compared with 1970, when Indians comprised 52.2 percent of the total IHS work force (171). There were 23 Indian medical officers and 9 Indian dental officers serving in IHS in 1984; but 6 of the medical officers and 1 dental officer were working in nonclinical capacities. In fiscal year 1983, nearly 60 percent of the staff in urban Indian health projects were Indian.

IHS estimates its unmet need for health professionals relative to workloads in terms of unfilled positions, using an application of the resource requirement methodology (described in ch. 6). In 1985, unfilled staff positions in IHS facilities and tribally operated health programs were estimated to exceed 1,500 health professionals, including 166 surgeons (among other types of physicians) and 697 nurses (137).

Table 5-4 shows numbers of IHS medical and dental officers, by area, and ratios per 1,000 estimated eligible service population in 1984. The physician-to-population ratio for IHS as a whole was 0.7 physicians per 1,000 population. The highest ratios were in the Alaska (1.4 per 1,000) and Phoenix areas (1.3 per 1,000), followed by Albuquerque, Billings, Navajo, and Tucson (ranging from 1.0 to 0.8 physicians per 1,000 service population). The dentist-to-population ratio for IHS as a whole was 0.3 dentists per 1,000 population.

For the U.S. population as a whole, there were 1.65 active, non-Federal, patient care physicians (1980) and 0.46 dentists (1979) per 1,000 persons (202). Within the United States, the supply of physicians and, to a lesser extent, dentists differs from metropolitan to nonmetropolitan areas. In 1980, the United States had 1.91 physicians per 1,000 population in metropolitan areas and 0.84 per 1,000 in nonmetropolitan areas. In 1979, dentists in the United States numbered 0.5 per 1,000 population in metropolitan areas versus 0.31 per 1,000 in nonmetropolitan areas. IHS average ratios of 0.7 physicians and 0.3 dentists per 1,000 eligible service population are closer to U.S. ratios for nonmetropolitan areas, which more nearly approximate IHS delivery locations, than to U.S. ratios for metropolitan areas.

Figure 5-3.—IHS Allocations by Area and Budget Category, Fiscal Years 1981 and 1985



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Administration and Management, 1985.

Table 5-1.—IHS Direct and Contract Care Budget Allocations in Dollars and Percent of Total, by Budget Category and Area, Fiscal Year 1985[a]

		Budget categories in direct care—dollars and percent of total direct care							
Area	Total direct care allocation	Hospitals and clinics	Dental	Mental health	Alcoholism	Maintenance and repair	Reimbursements[b]	Total contract care	Total IHS clinical services (direct and contract care)
Aberdeen	$ 39,071,600	$ 31,912,200 81.8%	$ 1,933,000 5.0%	$ 1,340,000 3.4%	$ 2,741,800 7.0%	$ 826,000 2.1%	$ 264,600 0.7%	$ 22,008,000	$ 61,025,600
Alaska	$ 82,109,500	$ 72,578,700 88.4%	$ 3,094,000 3.8%	$ 890,000 1.1%	$ 1,445,900 1.8%	$2,566,000 3.1%	$1,534,900 1.9%	$ 19,677,000	$101,786,500
Albuquerque	$ 32,757,900	$ 26,514,400 80.9%	$ 2,455,000 7.5%	$ 988,000 3.0%	$ 1,912,700 5.8%	$ 614,000 1.9%	$ 273,800 0.8%	$ 11,246,000	$ 44,003,900
Bemidji	$ 22,799,900	$ 19,436,700 85.2%	$ 949,000 4.2%	$ 407,800 1.8%	$ 1,794,100 7.9%	$ 166,000 0.7%	$ 46,300 0.2%	$ 9,304,000	$ 32,103,900
Billings	$ 23,459,100	$ 18,223,500 77.7%	$ 1,692,000 7.2%	$ 970,200 4.1%	$ 1,857,800 7.9%	$ 483,000 2.1%	$ 232,600 1.0%	$ 18,990,100	$ 42,449,200
California	$ 24,226,500	$ 20,767,400 85.7%	$ 335,000 1.4%	$ 202,000 0.8%	$ 2,918,100 12.0%	$ 0 0.0%	$ 4,000 0.0%	$ 534,000	$ 24,760,500
Nashville	$ 20,890,000	$ 18,373,200 88.0%	$ 586,000 2.8%	$ 403,000 1.9%	$ 1,286,100 6.2%	214,000 1.0%	$ 27,700 0.1%	$ 6,933,000	$ 27,823,000
Navajo	$ 73,150,800	$ 62,674,900 85.7%	$ 4,132,000 5.6%	$ 1,593,000 2.2%	$ 1,923,000 2.6%	$ 1,537,000 2.1%	$1,290,900 1.8%	$ 19,242,000	$ 92,392,800
Oklahoma	$ 66,241,200	$ 56,058,400 84.6%	$ 5,116,000 7.7%	$ 1,257,000 1.9%	$ 2,155,100 3.3%	$ 796,000 1.2%	$ 858,700 1.3%	$ 17,349,900	$ 83,591,100
Phoenix	$ 59,241,000	$ 50,648,200 85.5%	$ 2,379,000 4.0%	$ 1,121,000 1.9%	$ 2,053,200 3.5%	$ 1,030,000 1.7%	$2,009,600 3.4%	$ 14,618,000	$ 73,859,000
Portland	$ 19,758,400	$ 13,165,400 66.6%	$ 1,578,000 8.0%	$ 1,052,000 5.3%	$ 3,681,000 18.6%	$ 146,000 0.7%	$ 136,000 0.7%	$ 19,547,000	$ 39,305,400
Tucson	$ 9,052,700	$ 7,800,900 86.2%	$ 318,000 3.5%	$ 294,000 3.2%	$ 381,000 4.2%	$ 192,000 2.1%	$ 66,800 0.7%	$ 4,507,000	$ 13,559,700
IHS total	$472,704,600	$398,153,900 84.2%	$24,567,000 5.2%	$10,518,000 2.2%	$24,149,800 5.1%	$8,570,000 1.8%	$6,745,900 1.4%	$163,956,000	$636,660,600

[a] Allocations include fiscal year 1985 pay act mandatory increases. Total clinical services funding in this table, $636.7 million, is less than the $662.1 million reported in app. C, because this table excludes funds for IHS headquarters in Rockville, MD, and other administrative functions. Special equity funds ($5 million in fiscal year 1985), which most often are used to deliver clinical services, are not included. Funds administered by tribes under self-determination (638) contract programs are distributed among the direct and contract care categories.

[b] This budget category refers not to Medicare and Medicaid reimbursements, but to payments received from other Federal agencies, primarily for the use of IHS facility space.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Administration and Management, 1985.

Table 5-2.—IHS Staff by Function and Area, Fiscal Year 1984

Area	Clinical							
	Medical[a] officers	Dental[a] officers	Physician assistants	Nurses[b]	Other nursing[c]	Allied health	Administrative/ support	Total staff[d]
Aberdeen	25	20	10	161	81	179	439	915
Alaska	98	35	8	269	76	114	660	1,260
Albuquerque	52	20	12	157	66	181	430	918
Bemidji	18	13	0	50	12	53	124	270
Billings	40	17	1	77	32	125	324	616
California	1	0	0	0	0	4	56	61
Nashville	9	3	1	38	18	36	84	189
Navajo	145	42	25	393	245	341	842	2,033
Oklahoma	94	44	9	319	128	327	684	1,605
Phoenix	110	23	11	317	170	164	751	1,546
Portland	25	17	3	40	7	92	204	388
Tucson	14	3	3	26	17	22	69	154
Headquarters	14	3	0	12	15	28	315	387
IHS total	645	240	83	1,859	867	1,666	4,982	10,342

[a] During fiscal year 1984, an additional 44 medical officers and 29 dental officers served in nonclinical capacities. They have been excluded from these clinical categories and included in the administrative/support category.

[b] Nurses working in hospitals and clinics.

[c] Nurses working in other settings, e.g., community health and public health nurses.

[d] Total IHS staff in this table includes full-time, permanent IHS employees working in IHS facilities and programs, and IHS employees assigned to tribal 638 contract programs under Intergovernmental Personnel Act provisions. Staff of 638 contract programs hired directly by the tribes (both former Federal and non-Federal) are not included.

SOURCE: Adapted by the Office of Technology Assessment from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Annual Report to Congress on the Indian Civil Service Retirement Act, Public Law 96-135, Fiscal Year 1984," table XII.

Tables 5-2 and 5-4 should be interpreted carefully, because the number of IHS physicians in an area is dependent on the degree to which IHS and tribally operated direct services are available. For example, the numbers and rates of health professionals in California do not accurately reflect the situation there, because California delivers care entirely through tribal 638 contractors. Some employees of these tribal 638 contractors are not included in table 5-4 because they are direct tribal employees rather than IHS assignees through the Intergovernmental Personnel Act. This data limitation probably affects the Bemidji and Nashville areas as well, where there is a substantial amount of self-determination contracting. The Portland IHS area appears to be low in staffing, because nearly half of its clinical services budget is spent for contract care provided by private physicians and dentists. When these areas are excluded, the Aberdeen area stands out with a lower than average physician-to-population ratio.

Another means of comparing IHS staffing among the areas is to attempt to standardize for workload. Variations of this approach have been used in recent years by several IHS area directors (e.g., in the Aberdeen and Navajo areas) to examine and compare direct care workloads. The workload measure is the number of "clinical units," with each unit representing 1 hospital day. Outpatient visits are converted to clinical units by equating six outpatient visits to 1 hospital day (120). Table 5-5 presents such an analysis for fiscal year 1984. This table distinguishes clinical care staff from administrative staff.

What is evident in table 5-5 is that the distribution of IHS clinical staff among the areas is not necessarily related either to direct care workload, as approximated by the clinical units measure, or to the size of the service population. The number of clinical units delivered per clinical staff position in the Aberdeen area, for example, is about 63 percent higher than the number in the Albuquerque area. This finding, conditional as it is, tends to confirm reports from the field that in areas such as Aberdeen, the problems of attracting medical staff to extremely isolated rural areas are complicated by the demands of unusually heavy workloads.

An important source of medical and health professional staff for IHS is the PHS Commissioned Corps. Eighty-one percent of IHS's medical officers and 99 percent of its dental officers in clinical practice are members of the PHS Com-

Table 5-3.—IHS Indian and Non-Indian Employees by Profession and Area, Fiscal Year 1984[a]

Profession	Aberdeen		Alaska		Albuquerque		Bemidji[b]		Billings		California[b]		Nashville[b]	
	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian
Medical officers	2	26	0	103	1	54	0	18	2	38	0	2	0	11
Dental officers	2	19	0	36	1	23	0	14	0	18	0	2	0	4
Physician assistants	8	2	5	3	10	2	0	0	1	0	0	0	1	0
Nurses	51	114	18	252	58	105	11	40	26	52	0	1	8	32
Other nursing	78	3	44	32	64	2	9	3	32	0	0	0	18	0
Clinical support	85	99	40	77	90	102	15	40	62	64	0	4	15	23
Administrative support	356	70	409	241	361	45	83	37	288	33	33	19	60	17
Area total	582	333	516	744	585	333	118	152	411	205	33	28	102	87

Profession	Navajo		Oklahoma		Phoenix		Portland		Tucson		Headquarters		IHS total	
	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian	Indian	Non-Indian
Medical officers	4	145	8	89	1	117	1	27	1	15	3	21	23	666
Dental officers	1	44	1	45	2	24	2	16	0	3	0	12	9	260
Physician assistants	25	0	9	0	9	2	1	2	3	0	0	0	72	11
Nurses	116	281	106	217	89	237	16	24	6	20	9	6	514	1,381
Other nursing	240	5	125	3	163	7	5	2	17	0	13	2	808	59
Clinical support	230	123	181	156	108	66	41	57	10	12	9	24	886	847
Administrative support	727	92	600	65	556	165	144	50	58	9	149	139	3,824	982
Area total	1,343	690	1,030	575	928	618	210	178	95	59	183	204	6,136	4,206

[a] The 44 medical officers and 29 dental officers serving in administrative capacities are included with clinical officers in this table. As noted in table 5-2, IHS employees of tribal 638 contract programs assigned under the Intergovernmental Personnel Act are included with other IHS staff in the total 6,136 Indian and 4,206 non-Indian employees. Staff hired directly by tribal 638 programs (former Federal and non-Federal) are not included.

[b] Staffing may be low in Bemidji, California, and Nashville, because tribal direct employees of self-determination (638 contract) programs are not included.

SOURCE: Adapted by the Office of Technology Assessment from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Annual Report to Congress on the Indian Civil Service Retirement Act, Public Law 98-135, Fiscal Year 1984," table XII.

Table 5-4.—IHS Medical and Dental Officers in Relation to Eligible Service Population by Area, Fiscal Year 1984[a]

Area	IHS eligible service population (1984)	Clinical		Service population ratios	
		Medical officers	Dental officers	Physicians per 1,000	Dentists per 1,000
Aberdeen	70,648	25	20	0.4	0.3
Alaska	71,329	98	35	1.4	0.5
Albuquerque	51,211	52	20	1.0	0.4
Bemidji[b]	47,000	18	13	0.4	0.3
Billings	40,106	40	17	1.0	0.4
California[b]	71,642	1	0	0.0	0.0
Nashville[b]	35,822	9	3	0.3	0.1
Navajo	162,005	145	42	0.9	0.3
Oklahoma	190,451	94	44	0.5	0.2
Phoenix	82,309	110	23	1.3	0.3
Portland[c]	96,427	25	17	0.3	0.2
Tucson	17,852	14	3	0.8	0.2
Headquarters	0	14	3	—	—
IHS total	936,802	645	240	0.7	0.3

[a] The 44 medical officers and 29 dental officers serving in nonclinical capacities during fiscal year 1984 have been excluded from these calculations. As in tables 5-2 and 5-3, IHS employees of tribal 638 contract programs assigned under the Intergovernmental Personnel Act are included with IHS full-time, permanent staff. Staff hired directly by tribal 638 programs (former Federal and non-Federal) are not included.

[b] Numbers of staff may be low in these areas, because direct tribal employees of self-determination (638 contract) programs are not included. Consequently, service population ratios in these areas may be low.

[c] IHS staffing is low in the Portland area because there are no IHS hospitals there, and nearly half of the budget is spent on contract care.

SOURCES: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service: service population estimates are from the Population Statistics Staff; medical and dental officers in clinical practice are from the Office of Indian Resources Liaison (unpublished data), 1985.

missioned Corps (216). One of the most persuasive arguments in support of the Transfer Act of 1954 had to do with the recruitment of physicians, because at that time the BIA health program was heavily dependent on PHS for medical staff. The PHS Commissioned Corps offered better career opportunities than were available through BIA, including a commission that satisfied the military service obligation (with the end of the draft, this incentive ceased to exist).

Table 5-6 lists the number of PHS Commissioned Corps personnel serving in IHS in fiscal year 1984, by area, broken down by Indian and non-Indian officers and by clinical and nonclinical function. The 2,063 Commissioned Corps officers represented nearly 20 percent of total IHS staff. Only 7.2 percent of those positions, however, were filled by Indian members of the Corps.

The National Health Service Corps (NHSC) scholarship program, which now is being phased out, has been another important source of physicians for IHS. As of September 30, 1984, NHSC scholarships had been awarded to a total of 13,559 individuals. During fiscal year 1984, 1,303 NHSC recipients (including 1,131 physicians) began to fulfill their service obligations (164). Of these 1,303 NHSC scholarship recipients, 185 accepted placements in IHS: 155 physicians (in an IHS clinical care physician force of about 650), 22 nurses, and 8 dentists (196). In addition to working directly for IHS, NHSC providers have been employed in tribally operated 638 health programs; and in fiscal year 1983, nine urban Indian health projects received 18 NHSC assignees, representing almost 14 percent of the urban projects' total medical and dental staff (183). Nearly all physicians who enter IHS with NHSC scholarship payback obligations, however, leave after their obligation is fulfilled. Only about 5 percent stay at least 1 additional year (38).

The IHS health manpower scholarship programs, which are authorized by Title I of the Indian Health Care Improvement Act, have several special features designed to recruit and train new health professionals and to provide continuing education for IHS physicians, dentists, and other health providers. Scholarships authorized by section 103 of Title I provide support to Indian students who require additional education to compensate for deficiencies in their prior academic training in order to qualify for enrollment in a health professions school. Section 104 scholarships, which carry a service payback obligation, are awarded to students pursuing degrees in a variety of health professions. Non-Indians are eligi-

Table 5-5.—IHS Area Comparison of IHS Direct Care Workload by Clinical Units, Fiscal Year 1984[a]

Area	1984 service population	(i) Clinic outpatient visits	(ii) Hospital outpatient visits	(iii) Hospital days: Adults and peds.	(iv) Hospital days: Newborns	(v) Clinical units	(vi) Total staff	(vii) Clinical staff	(viii) Clinical units per staff	(ix) Clinical units per clinical staff
Aberdeen	70,648	116,660	295,104	44,612	2,654	115,893	915	476	127	243
Alaska	71,329	64,508	197,872	68,084	4,348	116,162	1,260	600	92	194
Albuquerque	51,211	108,754	162,900	27,467	1,485	74,228	918	488	81	152
Bemidji	47,000	47,037	62,349	5,380	242	23,853	270	146	88	163
Billings	40,106	169,519	100,866	11,819	800	57,683	616	292	94	198
California	71,642	86,440[b]	NA	NA	NA	0	61	5	—	—
Nashville	35,822	4,563	56,338	6,329	199	16,678	189	105	88	159
Navajo	162,005	111,305	462,894	88,813	9,881	194,394	2,033	1,191	96	163
Oklahoma	190,451	254,337	312,036	49,653	7,830	151,879	1,605	921	95	165
Phoenix	82,309	94,510	295,289	80,439	3,436	148,842	1,546	795	96	187
Portland	96,427	212,547	NA	NA	NA	35,425	388	184	91	193
Tucson	17,852	22,388	36,616	7,315	184	17,333	154	85	113	204
Headquarters	0	NA	NA	NA	NA	0	387	72	—	—
IHS total	936,802	1,206,128	1,982,264	389,911	31,059	952,369	10,342	5,360	92	178

[a] Utilization figures in this table represent IHS direct care workloads. Outpatient visits to tribally operated facilities and urban projects, and utilization data for the contract care program are not included in this table. Columns (i) through (iv) include IHS facilities only; column (v) assumes 6 outpatient visits equal 1 hospital day; and columns (vi) and (vii) include Federal employees assigned to tribal 638 contract programs through the Intergovernmental Personnel Act, but not staff hired directly by the tribal 638 contractors.

[b] Provisional data from California Program Office, Workload Statistical Summary, calendar year 1984.

SOURCES: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service. Service population estimates from the Population Statistics Staff; outpatient visits and hospital days from the Patient Care Statistics Staff; total staff and clinical staff from the Office of Indian Resources Liaison (unpublished data), 1985.

Table 5-6.—IHS Indian and Non-Indian Commissioned Corps Officers by Clinical and Nonclinical Function, Fiscal Year 1984[a]

Area	Indian			Non-Indian			Corps total	Percent by area
	Clinical	Nonclinical	Total	Clinical	Nonclinical	Total		
Aberdeen	11	2	13	102	29	131	144	7.0%
Alaska	5	0	5	215	44	259	264	12.8
Albuquerque	10	4	14	137	30	167	181	8.8
Bemidji	4	0	4	78	16	94	98	4.8
Billings	7	1	8	91	11	102	110	5.3
California	1	0	1	5	18	23	24	1.2
Nashville	0	0	0	39	9	48	48	2.3
Navajo	23	1	24	272	58	330	354	17.2
Oklahoma	30	3	33	229	37	266	299	14.5
Phoenix	27	1	28	257	43	300	328	15.9
Portland	10	1	11	84	16	100	111	5.4
Tucson	1	1	2	26	3	29	31	1.5
Headquarters	1	5	6	37	28	65	71	3.4
IHS total	130	19	149	1,572	342	1,914	2,063	100.0%

[a] Not included in this table are direct employees of tribal self-determination 638 programs. These exclusions affect some areas (e.g., Bemidji, California, and Nashville) more than others.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Indian Resources Liaison, computer printouts dated 01/17/85 and 9/30/85.

ble for scholarships authorized by section 104, although preference is extended to Indian applicants.

To determine the staffing categories for which scholarships will be awarded under its health manpower programs, IHS uses the resource requirement methodology, combined with information on current vacancies, attrition, and turnover. For the academic and fiscal year 1986, for example, section 103 scholarships were awarded in nursing and accounting and, for juniors and seniors, in premedicine and predentistry. Section 104 scholarships were awarded to students in medicine, nursing, accounting, master of public health programs, health records, pharmacy, engineering, nutrition/dietetics, sanitary science, and medical technology. From 1979 through the beginning of fiscal year 1986, 2,004 students had received IHS health scholarship program support (24).

IHS scholarship programs have had a dropout rate approaching 40 percent, but are credited with the graduation of 600 health professionals since 1979 (unfortunately, information is not available to specify graduates by profession). Approximately 80 percent of the 600 who have graduated continue to work for IHS (24). Thus, as a training and recruitment mechanism, the Indian health manpower scholarship programs hold promise. At present operating levels, however, it is not likely that the programs can support enough physicians to meet the expected loss of NHSC physicians. In addition, the scholarship programs are authorized and funded under the Indian Health Care Improvement Act, the reauthorization for which was vetoed in 1984 and had not been reenacted by the end of 1985; but the programs still operate under continuing resolution funding.

Although the retention of health care personnel, including NHSC assignees, traditionally has been viewed as a problem for IHS, the tribes also have a responsibility to take an active role in addressing it. Better retention of NHSC scholars after their obligations are completed could significantly enhance the stability of IHS medical staff in all areas. For the tribes, a more stable medical staff would improve the quality and range of services provided. It would be helpful if PHS Commissioned Corps officers were available for relocation within the system as needed, but there are limits to what can be done in the way of voluntary relocations. Remedying apparent staffing deficiencies in certain IHS areas would require acceptance by IHS and the tribes of a method of allocation that is driven more by relative need or demand than by historical funding patterns. Although a major redistribution of IHS health care delivery staff may not be easy to implement, the ranges in direct care physician- and dentist-to-population ratios and in clinical unit workload rates among IHS areas suggest that further work on this subject is in order.

Policies governing NHSC placements require that scholarship recipients repay their service obligations in designated health manpower shortage areas. These areas are designated by PHS on the basis of detailed sets of criteria involving geography, population characteristics, the availability of facilities, and other factors. Indian and Alaska Native groups are automatically designated as having primary care manpower shortages if they are groups of members of federally recognized tribes as defined in section 4 (d) of the Indian Health Care Improvement Act. If the Indian groups fit section 4 (c) of the act, the definition applicable to Indians who may not be reservation-based members of federally recognized tribes but who meet other criteria of being Indian, they may be designated if they meet other manpower shortage criteria applicable to non-Indian populations (42 CFR Part 5 app. A). In other words, all IHS service units are eligible for NHSC assignments, and IHS receives priority consideration in those assignments (60). Private practice options in medically underserved areas also are acceptable for NHSC paybacks and may provide some services to Indians.

In the absence of the NHSC, IHS will have to rely more heavily on the PHS Commissioned Corps and on its own scholarship programs to ensure a future supply of professionals, especially physicians, who are willing to work on reservations. A recent study of the U.S. medical school class of 1975 found that minority physicians of that class now provide more care to patients of their own racial or ethnic groups and to Medicaid patients than do their nonminority counterparts (59).

Problems of training and retaining health professionals will become critical for IHS over the next 5 years as the NHSC program is phased out. Although IHS has received preferential consideration with respect to the assignment of NHSC scholars in the past, that special relationship is not expected to continue beyond 1986. NHSC has placed 1,083 scholars who will begin repaying their service obligations in July 1986. Of this number, IHS requested 142 physicians and its request was met. Fifty-six of the IHS assignees, almost 40 percent, had elected to work in the IHS system; the remaining 86 were assigned to IHS without having indicated such a preference. While NHSC is no longer trying to project the distribution of placements beyond the 1986 cycle, its scholarship branch currently estimates that the following numbers of scholars (a few are not physicians) will be available in future years, from which IHS has no guaranteed assignments: 886 scholars in 1987; 413 in 1988; 76 in 1989; and 4 in 1990 (52). These figures may be slightly overestimated, subject to reduction for scholars choosing to buy out their obligation and for deaths.

The need to develop strategies for the replacement of NHSC medical personnel in the IHS system is an imminent problem. NHSC has begun to recruit unobligated physicians and other health professionals for career positions. Its goal is to establish and maintain permanent practices in areas having health manpower shortages. Although the success of such an approach would have been limited in recent years by a lack of individuals willing to practice in rural areas, conditions are changing. Economic factors such as a projected oversupply of physicians, along with a slight decrease in the average annual earnings among physicians and changes in health care delivery systems (e.g., greater enrollment in health maintenance organizations, which require fewer physicians), may mean that more physicians will be available and willing to work in rural areas. The Federal Government could encourage this possibility by strategies such as NHSC as a career or by offering financial incentives to individuals in exchange for agreements to work in underserved areas.

One difficulty with Federal intervention into medical manpower distribution is that commitments from health professionals are generally short term. In addition, the public may not be supportive of education subsidies in a field where supply now exceeds anticipated needs in many parts of the country. Bills have been pending in both Houses of Congress to extend the life of NHSC for 3 years: the Senate bill (S. 1285) would allow 450 new scholarships, and the House bill (H.R. 2234) would authorize 1,176 new scholarships over 3 years. Neither of these bills would make a significant contribution toward replacing IHS's projected loss of physicians, unless a large proportion of the new scholarships was targeted for payback in IHS.

Another option that is more directly within IHS's control would be to increase the number of IHS health manpower training scholarships available to persons for undergraduate degrees in premedicine, accompanied by a strengthened commitment to students in medical school through increased scholarship support. This option could be designed to include scholarships for other health professionals and might include non-Indians as well as Indians. Indian medical students also might be assisted through the activities of professional organizations such as the Association of Native American Medical Students and its parent organization, the Association of American Indian Physicians.

The recruitment of physicians to replace NHSC assignees from outside the Federal sector is another possibility. The potential of such an approach has not yet been examined, but large-scale direct hiring of medical personnel would have to be weighed carefully against the feasibility and costs of expanded contracting for needed staff and services.

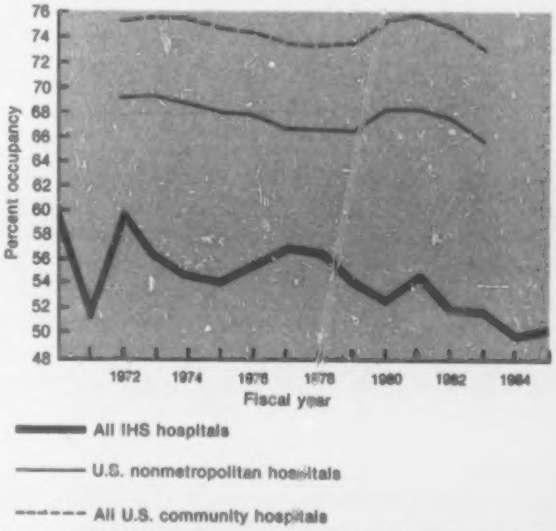
Delivery of Direct Care Services

IHS direct care services are delivered through an organizational structure of area and program offices and service units. The eight area offices and four smaller program offices (Tucson, Bemidji, Nashville, and California) serve defined geographic areas of varying sizes and service populations. Area and program office staffs allocate annual budgets among their several service units, which are the basic health care delivery units. As of October 1984, there were 123 service units, of which 44 were operated by the tribes under self-determination (638) contracts (191). Direct care services are delivered (or monitored, in the case of 638 contract services), and contract care referrals are authorized at the service unit level. Like the areas, the service units are responsible for varying budget allocations, eligible populations, and numbers of facilities.

The types of facilities in the IHS direct care delivery system include hospitals, health centers, health stations, health locations, and school health centers. The 51 IHS and tribally operated hospitals (discussed in greater detail below) vary greatly in size and service capabilities: for example, only 13 of them offer staffed surgery services. Most of the hospitals have active outpatient departments and often are the location for outpatient dental, mental health, and alcoholism services. Health centers are relatively comprehensive outpatient facilities that are open at least 40 hours per week. Health stations, which include some mobile units, are open fewer than 40 hours per week and offer less complete ambulatory services. Health locations are generally outpatient delivery sites (but not IHS facilities) that are staffed periodically by traveling health personnel.

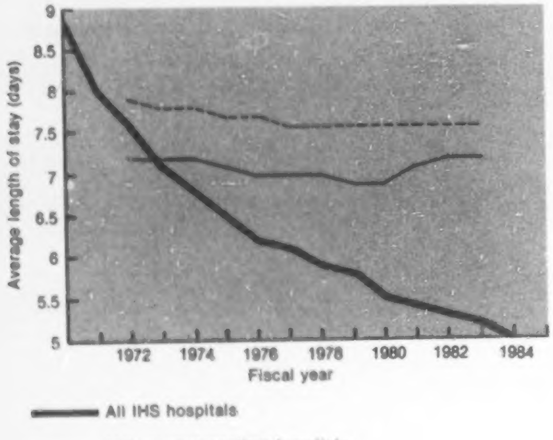
Figures 5-4 and 5-5 illustrate recent trends in hospital occupancy rates and average length of stay for all IHS hospitals, U.S. community hospitals, and U.S. nonmetropolitan community hospitals. IHS hospitals are smaller than the average U.S. community hospital; two-thirds of IHS hospitals (compared with about one-fifth of all U.S. community hospitals) have fewer than 50 beds. IHS hospital occupancy rates, in the range of 50 to 55 percent, have been consistently lower than

Figure 5-4.—Occupancy Rates in All U.S. Community Hospitals, U.S. Nonmetropolitan Hospitals, and IHS Hospitals, Fiscal Years 1970-85



SOURCES: **For all U.S. short-stay community hospitals and U.S. nonmetropolitan community hospitals:** AHA *Hospital Statistics*, editions for 1971 through 1984. **IHS hospitals:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Inpatient and Outpatient Summary Data for Indian Health Service Hospitals by Area and Facility," fiscal years 1970-85.

Figure 5-5.—Average Length of Stay in All U.S. Community Hospitals, U.S. Nonmetropolitan Hospitals, and IHS Hospitals, Fiscal Years 1970-85

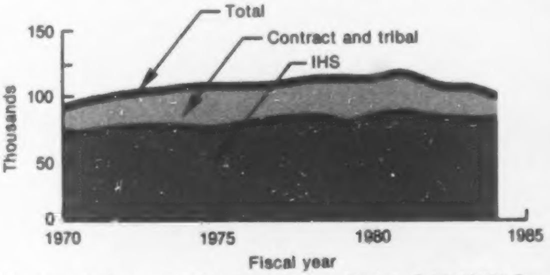


SOURCES: **For all U.S. short-stay community hospitals and U.S. nonmetropolitan community hospitals:** AHA *Hospital Statistics*, editions for 1971 through 1984. **IHS hospitals:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Inpatient and Outpatient Summary Data for Indian Health Service Hospitals by Area and Facility," fiscal years 1970-85.

the average 75 percent occupancy for all U.S. community hospitals. U.S. nonmetropolitan community hospitals, which are closer to IHS hospitals in size and range of services, have experienced occupancy rates of 65 to 70 percent (3).

Average lengths of stay (figure 5-5) in IHS hospitals have fallen from well above to below the average stays in all U.S. community and U.S. nonmetropolitan hospitals. While inpatient stays held relatively stable until 1983 at just below 8 days per stay in all U.S. community hospitals and between 7 and 7.5 days in nonmetropolitan hospitals (3), the average length of stay in IHS hospitals has declined steadily from a high of nearly 9 days per stay in 1970 to 4.9 days in 1984. It is likely that the lower average length of stay in IHS hospitals relates to the comparatively limited range of inpatient services many of these facilities offer (patients requiring specialized care usually are referred to private hospitals under contract care), but how much is explained by this factor is not known.

Figure 5-6.—Number of Admissions to IHS and Contract and Tribal Hospitals, Fiscal Years 1970-85



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, Rockville, MD, April 1985.

Total numbers of admissions to IHS hospitals peaked in 1978 at about 112,000 (including IHS and tribally operated hospitals, and contract care inpatient referrals) and have declined since that time to about 103,000 admissions in 1984 (see figure 5-6 and table 5-7). Contract care admissions declined more sharply than admissions to IHS direct care and tribally operated hospitals, which suggests the effects of limited contract care budgets. The combination of declining admissions and average lengths of stay explains the low and declining occupancy rates of IHS hospitals. Given the substantial increase in IHS's estimated eligible service population since 1970, however, other factors such as limited access to facilities, a limited range of services, and differences between IHS's estimated service population and its actual user population may contribute to declining hospital utilization. The overall hospital utilization rate decreased from 206 admissions per 1,000 IHS population in 1970 to 125 per 1,000 in 1984 (table 5-7). This compares with a current hospital utilization rate for the U.S. general population of about 159 discharges per 1,000 in 1982 (202). Figure 5-7 and table 5-8 show that the average number of patients receiving inpatient care (the average daily patient load) in IHS direct, IHS contract, and tribally operated hospitals combined has declined since 1980.

The discussion that follows will focus on health facilities and programs at the IHS area office level, including those operated by tribes under 638 self-determination contracts. (Detailed listings of fa-

Table 5-7.—Number of Admissions and Utilization Rate for IHS, Contract, and Tribal Self-Determination Hospitals, Fiscal Years 1955-84

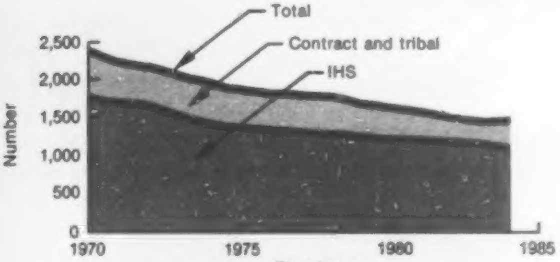
Fiscal year	Total utilization rate[a]	Total IHS and tribal admissions	Indian Health Service Total	IHS	Contract[b]	Tribal
1984	124.6	102,843	99,849	77,522	22,327	2,994
1983	130.1	104,806	102,961	78,027	24,934	1,845
1982	132.7	104,418	102,343	77,070	25,273	2,075
1981	142.3	109,353	107,087	81,387	25,700	2,266
1980	144.3	108,242	106,992	77,798	29,194	1,250
1979	157.8	107,269	106,329	75,174	31,155	940
1978	179.0	112,203	112,203	77,567	34,636	
1977	181.5	110,025	110,025	78,424	31,601	
1976	197.9	106,461	106,461	76,382	30,079	
1975	212.2	105,735	105,735	74,594	31,141	
1974	218.2	103,853	103,853	73,402	30,451	
1973	213.5	102,350	102,350	75,245	27,105	
1972	218.2	102,472	102,472	76,054	26,418	
1971	206.6	94,945	94,945	70,729	24,216	
1970	205.7	92,710	92,710	67,877	24,833	
1965	226.1	91,744	91,744	67,744	24,000	
1960	201.9	76,754	76,754	56,874	19,880	
1955	150.2	50,143	50,143	42,762	7,381	

[a] Number of admissions per 1,000 IHS estimated eligible service population.

[b] Number of discharges used as estimate for number of admissions.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *IHS Chart Series Book*, April 1985. Data published as table 5.5, from the following IHS documents: IHS Monthly Report of Inpatient Services; Annual Report 3I for contract hospitals; and area submissions for tribal hospitals.

Figure 5-7.—Average Daily Patient Load in IHS, Contract, and Tribal Hospitals, Fiscal Years 1970-85



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, Rockville, MD, April 1985.

cilities by type, with utilization data, by service unit and associated tribe, State, and IHS area are available from the Office of Technology Assessment (OTA).)

Table 5-9 summarizes the numbers of health facilities by IHS area and type, with utilization data, in fiscal year 1984. Two areas, Portland and California, have no IHS hospitals and hence no direct inpatient care. The small (18,000 service population) Tucson program office has one 40-bed hospital, the Nashville area has one IHS and one tribally operated hospital, and there are two IHS hospitals in the Bemidji area (both in Minnesota). The Phoenix and Aberdeen areas are served by nine hospitals each, all operated by IHS. There are five IHS and two tribally operated hospitals in Alaska (as of January 1986, a third IHS hospital converted to tribal control). The three IHS hospitals that are considered major medical referral centers, even though they do not offer all tertiary services, are located in Anchorage, Phoenix, and Gallup. Excluding California and Portland, which have no hospitals, inpatient beds per 1,000 IHS estimated eligible service population ranged from less than 1 bed per 1,000 in Bemidji (an area that is heavily dependent on contract care) to a high of 5.4 in Alaska (1984 beds and populations). The IHS average was about 2.4 beds per 1,000 (1984, combining IHS and 638 hospital beds). In 1982, there were 4.4 community short-stay hospital beds per 1,000 U.S. population, ranging from 3.3 per 1,000 in the Pacific region to a high of 5.9 per 1,000 in the West North Central region (including the Dakotas and Minnesota) (202).

Table 5-8.—Average Daily Patient Load (ADPL) in IHS, Contract, and Tribal *Self-Determination Hospitals, Fiscal Years 1955-84*

		Indian Health Service			
Fiscal year	Grand total ADPL	Total	IHS	Contract	Tribal
1984	1,392	1,353	1,072	281	39
1983	1,477	1,449	1,119	330	28
1982	1,488	1,460	1,121	339	28
1981	1,575	1,550	1,194	356	25
1980	1,594	1,576	1,178	398	18
1979	1,586	1,569	1,192	377	17
1978		1,723	1,256	467	
1977		1,710	1,302	408	
1976		1,736	1,299	437	
1975		1,768	1,330	438	
1974		1,840	1,376	464	
1973		2,013	1,499	514	
1972		2,172	1,626	546	
1971		2,177	1,627	550	
1970		2,353	1,729	624	
1965		3,127	2,244	883	
1960		3,142	2,232	910	
1955		3,711	2,531	1,180	

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *IHS Chart Series Book*, April 1985. Data published as table 5.8, from the following IHS documents: IHS Monthly Report of Inpatient Services; Annual Report 3I for contract hospitals; and area submissions for tribal hospitals.

IHS hospitals differ from the typical U.S. community hospital in that IHS hospitals are older, smaller in bed size, and more limited in the range of inpatient services they offer. The average IHS hospital is more than 35 years old. Of the 47 hospitals operated by IHS, 18 were built before 1940, 3 were built between 1940 and 1954, and 26 have been built since responsibility for Indian health was transferred to the Department of Health, Education, and Welfare (now DHHS) in 1955 (135).

In 1984, the IHS system consisted of 47 hospitals operated by IHS plus 4 hospitals operated by tribes: the hospitals at Dillingham and Nome, Alaska; the Creek Nation hospital in Oklahoma; and the Choctaw hospital in Mississippi. As of February 1986, two more IHS hospitals had converted to tribal operation, the Mt. Edgecumbe hospital in Southeast Alaska and the Oklahoma Choctaw hospital at Talihina. As of January 1985, 40 of the 47 IHS-operated hospitals were accredited by the Joint Commission on Accreditation of Hospitals (JCAH); the remaining 7 were not accredited (191). All four of the tribally operated hospitals had JCAH accreditation. JCAH accreditation represents a minimum level of adequacy in a hospital's physical facility, equipment, and staffing. Many IHS hospitals have corrected JCAH deficiencies since 1976, when only 23 of 51 hospitals were accredited. In 1984, 38 of the 47 IHS-operated hospitals met national fire and safety standards, and all hospitals are certified to receive Medicare and Medicaid reimbursements.

Most IHS hospitals are small, and many are more isolated geographically than the average U.S. community hospital even in nonmetropolitan areas. In 1982, the average U.S. hospital had 174 beds. Only 20 percent of all U.S. hospitals had 50 beds or fewer (representing about 4 percent of total beds). Two-thirds of the hospitals operated by IHS are in that size category (3). Twelve of the 47 IHS-operated hospitals have from 50 to 99 beds, and only 4 exceed 100 beds: Anchorage, Phoenix, Tuba City, and Gallup. Five IHS hospitals have only 14 or 15 beds (60).

Differences between IHS and U.S. community hospitals also are apparent in the scope of services they offer. In general, an IHS hospital is likely to provide a relatively wide range of health-related and social support services (e.g., social work, outpatient psychiatric and alcoholism services, family planning) and fewer high-technology services. An especially noticeable difference is in the availabil-

Table 5-9.—IHS and Tribally Operated Self-Determination (638) Facilities by IHS Area, With Fiscal Year 1984 Utilization

		Hospitals				Health centers		Health stations[c]	
IHS area	1984 IHS service population	Number	Beds[a]	Admissions	Outpatient visits	Number	Outpatient visits[b]	Number	Outpatient visits[b]
Aberdeen	70,648								
IHS		9	323	10,725	295,104	4	42,998	20	73,662
638		—	—	—	—	2	28,612	2	—
Alaska.........	71,329								
IHS		5	343	9,880	197,872	5	64,497	—	—
638		2	43[a]	1,483	26,369	3	257,866	172	—
Albuquerque ...	51,211								
IHS		5	209	5,629	162,900	8	75,652	12	33,102
638		—	—	—	—	1	13,620	1	—
Bemidji	47,000								
IHS		2	41	1,597	62,349	2	33,478	7	13,559
638		—	—	—	—	7	110,742	11	—
Billings	40,106								
IHS		3	86	3,472	100,866	9	157,211	3	18,690
638		—	—	—	—	—	—	—	—
California	71,642								
IHS		—	—	—	—	—	—	—	—
638		—	—	—	—	17	121,306	10	—
Nashville	35,822								
IHS		1	35	1,103	51,036	—	—	1	4,563
638		1	35[a]	693	18,798	10	76,142	4	—
Navajo	162,005								
IHS		6	400	18,638	462,894	9	105,789	13	59,402
638		—	—	—	—	1	3,144	—	—
Oklahoma......	190,451								
IHS		6	291	11,586	312,036	17	240,870	4	13,467
638		1	39[a]	818	4,984	6	59,558	—	—
Phoenix	82,309								
IHS		9	369	13,401	295,289	3	31,186	11	63,324
638		—	—	—	—	2	11,321	—	—
Portland	96,427								
IHS		—	—	—	—	12	202,555	4	9,992
638		—	—	—	—	4	32,650	9	—
Tucson	17,852								
IHS		1	40	1,285	36,616	2	21,453	1	935
638		—	—	—	—	—	—	—	—
Totals	936,802								
IHS		47	2,137	77,316	1,976,962	71	975,689	76[c]	290,696
638		4	117[a]	2,994	50,151	53	714,961[b]	209[c]	—[b]

[a] For tribally operated self-determination (638) hospitals, numbers of beds are reported from the 1984 *AHA Guide* (1983 survey data), because that information was not reported by IHS. Numbers of admissions and outpatient visits, however, are from the same 1984 IHS sources as for IHS hospitals.

[b] Outpatient visits to tribally operated health stations and to Alaska's 172 village clinics, not available separately, are included in numbers of visits to 638 health centers.

[c] Numbers of health stations include Indian school health centers and the 172 village clinics in Alaska. Health locations are not included.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation, and Legislation, Program Statistics Branch, 1985.

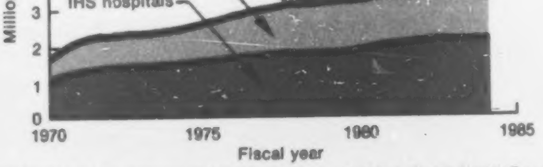
ity of surgical services. Of the 51 IHS and tribally operated hospitals, only 13 offer staffed surgery services (5 of these 13 are in Oklahoma), and an additional 4 hospitals deliver modified or limited surgery using part-time contract surgeons, for example, rather than staff surgeons. Difficulties in recruiting and retaining medical staff limit the types of services available at many IHS hospitals, and surgeons are particularly difficult to recruit, in part because there are no NHSC scholarships for surgeons.

The IHS major medical centers at Anchorage, Phoenix, and Gallup do not provide some of the sophisticated services that would be expected at many university teaching hospitals. The following are among the services not provided in any IHS hospital, according to the 1983 American Hospital Association Annual Survey of Hospitals: cardiac intensive care unit, open heart surgery, cardiac catheterization, X-ray radiation therapy and other megavoltage and radio-isotope therapeutic services, organ transplantation, burn care, and neonatal intensive care. Only nine IHS hospitals have a separate mixed intensive care unit, four operate premature nurseries, and three provide hospital-based renal dialysis (Tuba City, Sells, and Mississippi Choctaw). On the other hand, 32 of 51 IHS and tribally operated hospitals have obstetrical services and 42 offer dental services. Although outpatient psychiatric and alcoholism services are widespread, there is only one inpatient alcoholism service and there are five inpatient psychiatric units (2). In part because IHS direct inpatient services are relatively limited even where hospitals are accessible, the IHS contract care program (see discussion below) has been under increasing budgetary pressures in recent years to fill these service gaps.

In contrast to a declining trend in inpatient utilization, total ambulatory visits provided by IHS hospitals and direct care clinics, contract care referrals, and tribal facilities have more than doubled since 1970 (see figure 5-8 and table 5-10). About half of the total visits were delivered by IHS hospital outpatient departments. The number of ambulatory care visits provided by IHS direct care hospitals and clinics only has increased by nearly 80 percent since 1970, while contract care visits have declined by 24 percent since 1980 and visits to tribally operated facilities increased by 36 percent in that same period.

There were 1,786,920 ambulatory visits in 1970 for a total service population of 460,000, or about 3.9 visits per person. In 1984, 4,231,772 visits were provided (down slightly from totals for 1981 and 1982) for 936,802 eligible beneficiaries, a rate of 4.5 visits per person. In 1981, when the annual rate of IHS outpatient visits was 5.0 per person, all Americans made an average of 4.6 visits to hospital outpatient departments, clinics, group practices, and physicians' offices (202). Therefore, on the basis of utilization rates alone, it cannot be argued that IHS beneficiaries do not have adequate access to ambulatory services. On the other hand, however, national data indicate that higher rates of outpatient visits are to be expected among populations like those of IHS that are atypically young (under 6 years of age) or old (45 years and older), nonwhite, and in low family income groups.

Figure 5-8.—Numbers of Outpatient Visits to IHS, Contract, and Tribal Facilities, Fiscal Years 1970-85



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, Rockville, MD, April 1985.

The distribution of ambulatory care facilities among IHS areas and their approximate utilization in 1984 are shown in table 5-9 (referred to earlier). Utilization is approximate because not all of the tribally operated 638 facilities report to IHS data systems, and 638 clinics provide a substantial amount of health care in some areas. All of the ambulatory care facilities in California, for example, which are the only direct services provided by IHS, are 638 facilities. In the Nashville area, all clinics except one health station are tribally operated. When health stations and locations are excluded because of their small size and variable operating schedules, a comparison of health center availability among IHS areas reveals that the heaviest concentrations of facilities are in Oklahoma, California, and Portland.

Conclusions

IHS defines its responsibility for the health of American Indians to include many services that are beyond the scope of basic inpatient and ambulatory medical care. This broad definition seems appropriate to meet the special health needs and service delivery problems of isolated reservation-based Indian populations. As is discussed later in this chapter, however, IHS does not extend this broad definition to the health care needs of Indians living in urban areas. The IHS's traditional focus, derived from the long history of BIA involvement in Indian health, has been to serve reservation Indians. That role has been challenged in recent years by advocates of urban Indians. How to balance its response to the conflicting demands of these two groups, within current budg-

Table 5-10.—Numbers of Outpatient Visits to IHS, Contract, and Tribal Facilities, Actual for Fiscal Years 1955-84 and Estimates for 1985-86

		Indian Health Service					
Fiscal year	Grand total	Total	Hospitals	Health centers (including schools)	Other	Contract	Tribal
1986 (est.)	4,200,000	3,200,000	2,010,000	950,000	240,000	200,000	800,000
1985 (est.)	4,210,000	3,200,000	1,990,000	970,000	240,000	210,000	800,000
1984	4,231,772	3,248,660	1,982,264	1,019,764	246,632	218,000[a]	765,112
1983	4,190,721	3,252,701	1,955,462	1,049,843	247,396	236,690	701,330
1982	4,266,776	3,334,365	1,973,688	1,109,960	250,708	236,706	695,705
1981	4,284,198	3,319,479	1,934,590	1,155,294	229,595	266,577[b]	698,142
1980	4,058,568	3,194,935	1,795,607	1,120,737	278,592	275,000[a b]	588,633
1979	3,880,850	3,083,350	1,710,686	1,059,690	312,974	275,000[a b]	522,500[a]
1978		3,124,716	1,783,642	1,009,960	331,114		
1977		2,960,850	1,715,114	910,356	335,380		
1976		2,751,546	1,593,130	871,796	286,620		
1975		2,501,050	1,465,816	778,411	256,823		
1974		2,361,654	1,366,564	719,700	275,390		
1973		2,329,160	1,330,660	712,282	286,218		
1972		2,235,881	1,275,726	603,443	356,712		
1971		2,195,236	1,202,027	572,869	420,340		
1970		1,786,920	1,068,820	459,713	258,386		
1965		1,325,400	757,700	567,700			
1960		989,500	585,100	404,400			
1955		455,000	355,000	100,000			

[a] Estimate.

[b] Comparable contract care data not available prior to fiscal year 1981.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *IHS Chart Series Book*, April 1985. Data published as table 5.11.

etary constraints, is a problem that IHS must begin to address. According to the 1980 U.S. census, 54 percent of the 1.4 million individuals who identified themselves as Indian lived in metropolitan areas. Most urban Indians now are excluded from IHS estimated service populations; but a gradual strengthening of urban Indian claims for IHS services may be anticipated if urban Indian populations continue to grow.

Whether in an urban or a reservation setting, however, the delivery of health services to American Indians cannot be accomplished by the same means used to provide health care to the general U.S. population. The socioeconomic, cultural, and geographic isolation of many Indians, and the dominating presence of the Federal Government through IHS and BIA, create circumstances that necessitate special approaches to health care delivery. Independent of problems relating to IHS funding levels, the expressed demand for health services and the availability of IHS facilities vary so much from one IHS area to another that no single benefits package or delivery strategy is likely to be successful in all areas. In some areas, few health services other than those provided by IHS are readily available and accessible to Indian populations. Even in areas where non-IHS "alternate resources" (other public and private health care providers) are available, some Indians who have private insurance may prefer to use IHS direct services because they feel they are entitled to them, they want to avoid the deductibles and copayments associated with private insurance, or they feel more comfortable with IHS than with private providers.

This section of chapter 5 has presented a description of the IHS direct care program centered on the most important component of that program, the medical services provided by IHS and tribally operated hospitals and clinics. It may be concluded that the volume and scope of IHS hospital and clinic services vary considerably among the areas, apparently without consistent basis. The inventory of services provided directly by IHS and by tribal 638 facilities reveals a system that has evolved in an unplanned manner in response to changing BIA and IHS policies for health care delivery, variable and incompletely documented local needs and demands, and the limits of available funding as appropriated by Congress. Clearly, IHS does not deliver the same package of health services in each of its areas. This may not necessarily be bad, because it is likely that health problems also differ among the areas. However, it appears that there have been no systematic attempts to match the services that are delivered to area-specific health problems and service needs. Both among and within the 12 areas of the decentralized IHS system, a more rational approach to needs assessment and services planning could result in more cost-effective decisionmaking about appropriate types and volumes of health services.

IHS staffing, which represents the major cost component of hospital and clinic services, has been described. It may be concluded that in keeping with the uneven availability of IHS facilities and services, IHS staffing distributions by area and service unit also could be more closely adjusted to eligible or user population size and actual utilization trends. This might require new placement policies and the relocation of PHS Commissioned Corps and NHSC staff to areas of greatest need. Future sources of IHS medical staffing will have to be rethought in general, however, because the NHSC program is being discontinued and the Commissioned Corps is not an actively expanding resource.

Shortages of particular types of clinical staff may limit the range of services provided in a given service unit and, consequently, affect the extent to which the service unit must rely on contract health services. This problem will be aggravated in the future unless medical officers can be recruited from other sources to fill positions vacated by NHSC assignees. The Indian health manpower scholarship program, although small, is one possible solution to this staffing problem. It would be costly to recruit IHS physicians from the private sector by offering competitive salaries, but so would be an increasing dependence on contract services purchased from the private sector to supplement diminishing IHS direct care capabilities.

THE IHS CONTRACT CARE PROGRAM

The purpose of the IHS contract health services or contract care program is to supplement the services provided by IHS direct care hospitals and clinics. Since 1981, the contract care program has represented about 20 percent of total annual IHS allocations and 25 percent of the IHS clinical services budget. This program provides for the purchase of medical services for IHS beneficiaries from non-IHS providers. The purchase of outside services is essential to the overall IHS health care delivery system because many IHS hospitals and clinics do not have the staff and equipment necessary to offer a full range of services, particularly specialty services, and because not all eligible Indians live within a reasonable travel distance of IHS facilities.

Contract services have long been part of the Indian health system. Authority for BIA to enter into health services contracts for Indians was established by the Johnson O'Malley Act of 1934 and transferred with IHS to the Department of Health, Education, and Welfare (now DHHS) in 1955. The present IHS contract care program purchases hospital medical-surgical services and ambulatory care, including outpatient physician care, laboratory, X-ray, pharmacy, limited dental care, and patient and escort travel. The services are delivered under approximately 1,300 ongoing contracts, mostly with private physicians, and by special purchase orders for other authorized services. Contract care programs in some IHS service units are operated by the tribes under 638 self-determination contracts. The types and amounts of contract services purchased vary from one area and service unit to another depending on medical need and the capabilities of local IHS and tribally operated facilities.

Eligibility and Funding for Contract Care

Contract care funding is appropriated annually as a separate category within the IHS clinical services budget. The contract care allocation grew from over $109 million in fiscal year 1980 to $158 million for 1984. Approximately $164 million was allocated to purchase contract health services in fiscal year 1985. Figure 5-1 (in "The IHS Direct Care Program" section, above) illustrates trends in the total IHS budget since 1972; growth in contract care funding since 1981 is shown in figure 5-2 (for detailed budget data over the years, refer to app. C).

Eligibility requirements for contract care are more restrictive than those applied to IHS direct care. It is possible for a patient being treated in an IHS hospital, and requiring services that hospital cannot provide, to be denied referral for the services because of ineligibility for the contract care program (although how frequently this situation occurs cannot be documented). In order to qualify for contract care, an individual must be eligible for direct care. IHS direct care may be provided "to persons of Indian descent belonging to the Indian community served by the local facilities and program" (42 CFR 36.12 (a)), which may be determined by tribal membership, residence on tax-exempt land, participation in tribal affairs, or other factors consistent with BIA policies. An individual must meet an additional residency requirement to qualify for contract care: that is, he or she must (168):

- reside on a reservation located within a contract health service delivery area (CHSDA) as designated by IHS; or
- reside within a CHSDA, and either "be a member of the tribe or tribes located on that reservation or of the tribe or tribes for which the reservation was established, or maintain close economic and social ties with that tribe or tribes"; or
- be an eligible student, transient, or Indian foster child.

A CHSDA is defined as "a county which includes all or part of a reservation, and any county or counties which have a common boundary with the reservation" (42 CFR 36.22 (a) (6)). This "on or near" a reservation residency requirement was formally applied to the contract care program by 1978 regulations in response to the 1976 lawsuit, *Lewis v. Weinberger*, which required a definition of the term.

Congress has legislated and IHS has developed regulatory exceptions to the general rule that CHSDAs consist of counties containing and/or adjoining a reservation. The entire States of Alaska, Nevada, and Oklahoma are specially designated CHSDAs, as are groups of counties in the States of Michigan, Wisconsin, and Minnesota (42 CFR 36.22 (a)). Arizona was provisionally designated a CHSDA, for 1982 through 1984, but it did not operate as one because the Arizona tribes would not agree to expanded eligibility for contract services without additional funding, and no such appropriation was made (60). The Indian Health Care Amendments of 1985 (H.R. 1426 and S. 277, not enacted by the end of 1985) proposed an extension of the Arizona CHSDA designation with authorization for additional funding.

In California, all IHS services are tribally administered and all services that cannot be provided by the outpatient clinics themselves (e.g., specialty care, hospitalization, laboratory, radiology, and optometry services) must be provided through contract care. Eligibility requirements for contract care in California have been under dispute since contract health service regulations first were published. According to the executive director of the California Rural Indian Health Board, one of the organizations established in 1970 to return IHS resources and services to California (44):

> . . . (Sixteen) local health projects service units were created throughout rural California as CRIHB (California Rural Indian Health Board) subcontractors. By and large, these service units encompassed more than one county and were constituted without reference to the number or location of Indian tribes in those service units. In practice, with the acknowledgment of the IHS, it was these multi-county service units that have been viewed as "CHSDA's" for provisions of contract health services to eligible residents of the service units for fifteen years.

According to IHS (60):

> After the issuance of CHS (Contract Health Services) regulations, services were continued in California (and in a number of other places) to eligible Indians who did not meet the new CHS regulations. Such services were continued on the basis of direction contained in congressional appropriation action rather than the CHS regulations.

A provision of the vetoed 1984 reauthorization of the Indian Health Care Improvement Act and of the 1985 amendments would have resolved the eligibility issue in California by designating the entire State, excluding nine heavily urbanized counties, as a CHSDA. Pending enactment of the amendments or possible revision of the eligibility regulations, the California projects are continuing to serve their usual populations (32).

The 1976 American Indian Policy Review Commission recommended that all IHS services, including direct and contract, be made available on the basis of tribal membership rather than residence (128). More recently, the 1983 Contract Health Services Task Force supported combined eligibility for IHS direct and contract services, with eligible persons being of Indian blood, being members of federally recognized tribes, living in clearly defined IHS service areas (e.g., CHSDAs), and being formally enrolled for services. The task force considered defining eligibility based on Indian blood quantum, but rejected that approach primarily because of the lack of reliable data to document blood quantum (181).

Funding and Utilization of Contract Care by IHS Area

The amount of contract care funding, contract care in relation to direct care dollars, and the types and amounts of services purchased under contract care all vary among IHS areas. Although information to document the extent of these variations is not as detailed as might be wished, available data are presented here. Note that incomplete and sometimes inconsistent reporting from contract care programs administered by tribes under self-determination (638) contracts affects these data tables.

Table 5-11 shows provisional budget obligations, or commitments, by general category of contract care expenditure for fiscal years 1983 and 1984, with estimated obligations for 1985 and 1986. Obligations for hospital services represent about half of total contract care expenditures. The contract care medical priority system (described later) tends to authorize acute inpatient services rather than less urgent outpatient care, and there have been substantial increases in the average cost per hospital day since 1983. Recent reductions in contract care hospital average daily patient load —from about 312 inpatients per day in fiscal year 1983 to an estimated 282 inpatients per day in 1985 and 273 inpatients per day in 1986—are the result of increased per diem costs and slowing growth in contract care program funding. Declining numbers of contract care ambulatory visits, patient and escort trips, and dental services also are projected as unit costs increase more rapidly than overall budget allocations (162,163).

Table 5-12 and figure 5-9 present 10 leading causes of hospitalization for patients in IHS hospitals and in contract general hospitals, fiscal year 1984 (the four hospitals operated by tribes under self-determination contracts are not included). Although the differences are not striking, admissions to contract care hospitals showed higher proportions of injuries, poisonings, and diseases of the digestive and circulatory systems. IHS direct care hospitals provided relatively more care for complications of pregnancy and childbirth (the leading cause of all admissions) and mental disorders.

Table 5-13 shows a breakdown of fiscal year 1984 contract care obligations by IHS area, with contract care as a percent of total clinical services funding, service population estimates, and per capita contract care funding. Although contract care represents about 25 percent of the IHS clinical services budget, there are wide variations in the extent to which the areas rely on contract care, ranging from only 19 percent of the clinical services budget in Alaska to a high of nearly 50 percent in the Portland area.

In the Nashville area, where about one-third of the inpatient days and two-thirds of the ambulatory visits are delivered by tribal 638 programs, 25 percent of the clinical services budget is obligated to contract care. In California, however, where all IHS services (mainly ambulatory care) are provided under self-determination contracts, only 3 percent of the clinical care budget ($525,000) is obligated specifically to the contract care program. The California figures are not comparable to those for other areas because of the way in which contract care funds have been accounted to direct or contract care budget categories. Most

Table 5-11.—Estimated IHS Contract Care Obligations by Type of Expenditure, With Utilization and Unit Costs, Fiscal Years 1983-86[a]

Type of expenditure	Fiscal year 1983 (provisional)	Fiscal year 1984 (provisional)	Fiscal year 1985 (estimate)	Fiscal year 1986 (estimate)
Hospitalization				
Cost per day	$ 644	$ 719	$ 792	$ 872
Average daily patient load	312	299	282	273
Dollars	$ 73,544,000	$ 78,703,000	$ 81,708,000	$ 86,773,000
Ambulatory care				
Cost per visit		$ 109	$ 116	$ 124
Visits		273,082	266,000	265,000
Dollars	$ 29,988,000	$ 29,766,000	$ 30,902,000	$ 32,818,000
Patient and escort travel				
Cost per one-way trip		$ 136	$ 164	$ 197
Number of trips		38,044	33,000	29,000
Dollars	$ 3,937,000	$ 5,174,000	$ 5,372,000	$ 5,705,000
Dental services				
Cost per patient		$ 186	$ 207	$ 220
Number of patients		39,420	38,000	37,000
Dollars	$ 6,597,000	$ 7,338,000	$ 7,656,000	$ 8,130,000
Other				
Dollars	$ 30,840,000	$ 36,929,000	$ 38,318,000	$ 32,440,000
Total IHS contract care obligations	$144,906,000 (provisional)	$157,910,000 (provisional)	$163,956,000 (estimate)	$165,866,000 (estimate)

[a] These IHS contract care obligations are presented to show the relative importance and costs of the five major contract care expenditure categories. Contract care programs managed by the tribes as self-determination (638) programs are not included. Because the figures are taken from briefing books prepared by IHS for its annual appropriations hearings, fiscal years 1985 and 1986 are proposed rather than actual appropriations, and figures for fiscal years 1983 and 1984 are provisional.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Appropriations Briefing Books," fiscal years 1985 and 1986.

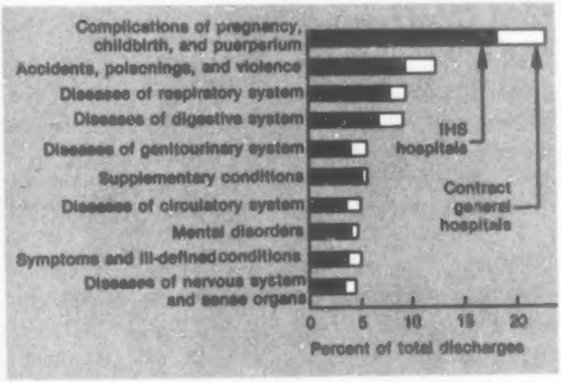
Table 5-12.—Ten Leading Causes of Hospitalization for General Medical and Surgical Patients, IHS and Contract General Hospitals, Fiscal Year 1984[a]

Diagnostic category	Number of discharges			Percent distribution		
	Combined	IHS	Contract	Combined	IHS	Contract
All categories	99,816	77,561	22,255	100.0	100.0	100.0
Complications of pregnancy, childbirth, and puerperium	23,248	18,642	4,606	23.3	24.0	20.7
Injuries and poisonings	12,432	9,070	3,362	12.4	11.7	15.1
Respiratory system diseases	9,413	7,181	2,232	9.4	9.3	10.0
Digestive system diseases	9,243	6,769	2,474	9.3	8.7	11.1
Genitourinary system diseases	5,397	4,091	1,306	5.4	5.3	5.9
Supplementary conditions	5,253	5,045	208	5.3	6.5	0.9
Circulatory system diseases	5,172	3,537	1,635	5.2	4.6	7.3
Mental disorders	4,720	3,873	847	4.7	5.0	3.8
Symptoms and ill-defined conditions	4,699	3,738	961	4.7	4.8	4.3
Nervous system and sense organs	4,108	3,108	1,000	4.1	4.0	4.5
All other	16,131	12,507	3,624	16.2	16.1	16.3

[a] Hospitalizations in tribal self-determination (638) hospitals are not included in this table.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *IHS Chart Series Book*, April 1985. Data published as table 5.7, from IHS Annual Reports 2C and 3I.

Figure 5-9.—Ten Leading Causes of Hospitalization in IHS and Contract General Hospitals, Fiscal Year 1984[a]



[a]Hospitalizations in tribal 638 hospitals are not included in these figures.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, Rockville, MD, April 1985.

self-determination funding is accounted in direct care budgets, although it may be used to purchase some services under contract. The $525,000 in California represents the contract care programs of only two tribes and does not include contract care that may have been purchased by other 638 projects (43,58).

Other IHS areas besides Portland in which the proportion of contract care funding is high are Billings, Aberdeen, and Tucson (note that all three of these areas have higher per capita contract care obligations than the Portland area, and Billings has a contract care budget equivalent to Portland's to service a population half the size). IHS areas that have relatively comprehensive direct care capabilities, such as Alaska, Phoenix, Navajo, and Oklahoma, have lower proportions of contract care funding in their total clinical services budgets. Per capita contract funding among the areas ranges from $86 in Oklahoma to $473 in Billings, with an average per capita obligation of $182 (excluding California).

Table 5-14 presents fiscal year 1984 utilization data on inpatient care delivered by IHS direct care hospitals, IHS contract care hospitals, tribally operated (638) hospitals, and tribally operated contract care programs. Numbers of admissions, inpatient days, and average lengths of stay may be compared among the areas in these delivery settings. Average lengths of stay by type of hospital varied little around the combined average of about 5 days per stay. The tribally operated hospitals had shorter average stays, but that was in only four hospitals. Combined average lengths

Table 5-13.—IHS Contract Care Program Obligations by Area, Total and Per Capita, Fiscal Year 1984[a]

Area	Contract care program obligations fiscal year 1984	Contract care as percent of clinical services	IHS estimated service population 1984	Contract care dollars per capita
Aberdeen	$ 20,029,000	33.4%	70,648	$283.50
Alaska	19,296,000	18.5	71,329	270.52
Albuquerque	10,694,000	24.7	51,211	208.82
Bemidji	8,980,000	28.9	47,000	191.06
Billings	18,976,000	44.6	40,106	473.15
California	525,000	2.5	71,642	7.33
Nashville	6,712,000	25.6	35,822	187.37
Navajo	19,074,000	21.1	162,005	117.74
Oklahoma	16,478,000	20.5	190,451	86.52
Phoenix	14,284,000	20.2	82,309	173.54
Portland	18,549,000	48.6	96,427	192.36
Tucson	4,330,000	33.9	17,852	242.55
All areas	$157,927,000	24.5%	936,802	$168.58
All areas excluding California	$157,402,000	24.4%	865,160	$181.93

[a]All IHS services in California are delivered via tribal self-determination (638) contracts. Most 638 funding is accounted in direct care budgets, although it may be used to purchase some services under contract. This may explain the small contract care budget in California, which represents specific contract care obligations for only two projects. The Bemidji and Nashville areas also have substantial tribal 638 health delivery programs. Figures for Alaska are somewhat low due to delayed data reporting.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Administration and Management, Resources Management Branch, 1985.

Table 5-14.—Numbers of Admissions, Hospital Days, and Average Lengths of Stay (ALOS) in IHS, Contract General, and Tribal Self-Determination Hospitals, Fiscal Year 1984

	Combined			IHS direct care			IHS contract care[a]			Tribal (638) direct care			Tribal (638) contract care		
Area	Admissions	Days	ALOS	Admissions	Days	ALOS	Admissions	Days	ALOS	Admissions	Days	ALOS	Admissions	Days	ALOS
Aberdeen	15,528	69,038	4.4	10,725	44,612	4.2	4,803	24,426	5.1	—	—	—	—	—	—
Alaska	11,972	75,678	6.3	9,880	68,084	6.9	609	2,605	4.3	1,483	4,989	3.4	—	—	—
Albuquerque	7,089	32,956	4.6	5,629	27,467	4.9	1,460	5,489	3.8	—	—	—	—	—	—
Bemidji	3,667	14,440	3.9	1,597	5,380	3.4	780	3,257	4.2	—	—	—	1,290	5,803	4.5
Billings	7,440	30,447	4.1	3,472	11,472	3.4	3,968	18,628	4.7	—	—	—	—	—	—
California	847	4,234	5.0	—	—	—	—	—	—	—	—	—	847	4,234	5.0
Nashville	4,017	20,091	5.0	1,309	6,329	4.8	422	1,804	4.3	693	3,227	4.7	1,593	8,731	5.5
Navajo	20,640	97,349	4.7	18,638	88,813	4.8	1,424	5,647	4.0	—	—	—	578	2,889	5.0
Oklahoma	14,634	66,177	4.5	11,586	49,653	4.3	2,230	11,616	5.2	818	4,908	6.0	—	—	—
Phoenix	15,460	89,998	5.8	13,401	80,439	6.0	2,059	9,559	4.6	—	—	—	—	—	—
Portland	4,222	18,035	4.3	—	—	—	4,222	18,035	4.3	—	—	—	—	—	—
Tucson	1,635	9,094	5.6	1,285	7,315	5.7	350	1,779	5.1	—	—	—	—	—	—
All areas	107,151	527,190	4.9	77,522	389,911	5.0	22,327	102,845	4.6	2,994	13,124	4.4	4,308	21,657	5.0

[a] Number of discharges used as estimate for number of admissions.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, unpublished data from the IHS Program Statistics Branch, Monthly Report of IHS Inpatient Services; Annual Report 3I for contract hospitals; and IHS area submissions for tribal hospitals, October 1985.

of stay by area ranged from a low of 3.9 days in Bemidji (on a low volume of admissions) to a high of 6.3 days in Alaska. In the Billings area, more than half of the inpatient admissions were to non-IHS contract general hospitals. In the Nashville area, more patients were admitted to community hospitals under tribally operated contract care programs than to the one tribal hospital, the IHS direct care hospital, or to community hospitals by IHS-operated contract care programs. Well over half of the inpatient admissions in the Aberdeen, Alaska, Albuquerque, Navajo, Oklahoma, Phoenix, and Tucson areas were to IHS direct care hospitals. Because there are no IHS or tribally operated hospitals in the Portland or California areas, in Portland all inpatient care was provided through the contract care program; and in California, the few admissions that were reported were authorized by tribally operated contract care programs.

Additional information on fiscal year 1984 expenditures for inpatient care and outpatient visits in the 12 IHS area contract care programs is presented in table 5-15. Total combined 1984 inpatient and outpatient expenditures in table 5-15, approximately $94 million, represent only part of the overall 1984 contract care budget allocation of $158 million (table 5-13). Excluded from table 5-15 are disbursements for patient and escort travel (about $5 million), dental services ($7 million), and other types of contracts ($37 million). Incomplete cost data reporting may account for the remainder of the difference. Note also that data in table 5-15 cannot be compared directly with those in table 5-14 because they come from different IHS source reports. The average costs (disbursements) per "full-pay equivalent" inpatient day and outpatient visit in table 5-15 are artificial figures that combine proportions of days and visits paid in full by IHS with those partially paid by IHS and partially paid by other sources. These figures are used by the IHS contract care program for budget planning purposes only. A comparison of actual inpatient days by area in table 5-14 with full-pay equivalent days in table 5-15 suggests that 638 contract care programs may have been included in Alaska but excluded from Bemidji and Nashville data. Most other inpatient day figures are reasonably close, except in the Portland area. Data reporting appears to be incomplete for California.

Actual contract care disbursements per full-pay equivalent inpatient day varied substantially among IHS areas. The lowest cost, $535 per inpatient day in the Bemidji area, was only 60 percent of the $902 average cost per day paid in Alaska. Albuquerque, Nashville, and Tucson also had high costs per contract care inpatient day. A

Table 5-15.—IHS Contract Care Program, Utilization and Costs for Inpatient and Outpatient Care, by Area, Fiscal Year 1984

	Inpatient care			Outpatient care		
Area	Total disbursements[a]	Cost per full-pay day	Full-pay equivalent days	Total disbursements	Cost per full-pay visit	Full-pay equivalent visits
Aberdeen	$13,325,540	$598	22,284	$ 2,935,501	$124	23,673
Alaska	6,295,317	902	6,979	2,552,971	145	17,607
Albuquerque	4,943,063	843	5,864	1,833,540	173	10,598
Bemidji	1,576,977	535	2,948	1,187,296	103	11,527
Billings	13,232,389	698	18,958	3,044,936	91	33,461
California	NA	NA	NA	NA	NA	NA
Nashville	918,836	813	1,130	202,604	137	1,479
Navajo	5,572,359	799	6,974	3,022,670	57	53,029
Oklahoma	7,333,354	780	9,402	2,128,747	134	15,886
Phoenix	6,948,429	802	8,664	1,985,347	154	12,892
Portland	7,876,537	717	10,985	4,844,191	143	33,875
Tucson	1,583,336	867	1,826	203,320	142	1,432
IHS total	$69,606,628	$722	96,014	$23,953,263	$111	215,459

[a] Total disbursements are combined full pay by IHS contract care program, partial pay, and unknown pay. "Full-pay equivalent" days and visits are artificial figures developed for comparability with the total disbursement figures. Outpatient visit expenditures include physician, X-ray, laboratory, emergency room, drugs, prostheses, and other expenses, but no patient and escort travel. Data from tribal (638) contract care programs are not included in this table, which accounts for the lack of information from California.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, October 1985.

number of factors may contribute to such differences, including the charges prevailing among local private sector providers, a service unit's ability to negotiate reasonable charges, and the relative severity of the cases for which contract care was authorized. Average costs for full-pay equivalent contract care outpatient visits also were variable. They appear to be high in table 5-15 because all expenditures associated with the outpatient visits, such as physician fees, X-ray, laboratory, emergency room, drugs, and prostheses were included.

Service-specific contract care program cost data are available from a so-called "piggyback" data system that has been added onto the Health Resources and Services Administration (HRSA) accounting system. By grouping contract care expenditures by cost center code, the system can generate utilization and cost data by service and IHS area. The piggyback data system is the source of table 5-16, which shows a breakdown of fiscal year 1984 area contract care disbursements, combining full and partial pay, by percent of total area funds devoted to each cost center. The five main cost centers are: patient and escort travel; dental care; inpatient care; outpatient visits; and an "other" category that includes payments for nursing home care, the Pascua-Yaqui prepaid plan in the Tucson area, and use of other medical specialists. The category "contracts to support direct services" includes ongoing contracts for medical professionals and services delivered in IHS facilities (in some areas, a good deal of dental care is provided under such contracts). The final category includes incomplete data on contract care expenditures by tribes under self-determination contracts (58).

The amount of contract care reported to be administered by tribes varies widely among the areas and distorts the proportions of total disbursements that are attributed to each of the major cost centers. This is because available data were not adequate to distribute 638 expenditures among those cost centers. In the Nashville area, 87 percent of total contract care disbursements were administered by the tribes, and in California, the figure was 82 percent; but the average throughout IHS was only 19 percent of contract care funds. The Billings and Phoenix areas indicated that no contract care funds were disbursed by 638 programs. The Navajo area reported that it managed 22 percent of its contract care allocation via 638 contract, but IHS headquarters stated that the Navajo have only one 638 contract for about $200,000 and it is not for contract care (216). Because of data questions such as these, little can be concluded from table 5-16 except for IHS as a whole, where inpatient services represent more than half of all contract care expenditures. The Aberdeen, Alaska, and Albuquerque areas are roughly comparable to overall IHS proportions in the five main cost centers; Phoenix and Oklahoma are close; but the other areas are difficult to interpret.

Operation of the Contract Care Program

The contract care program may purchase medical services when no IHS direct care facility is available, when the direct care facility is not capable of delivering the emergency or specialty care required, when the workload of the direct care facility exceeds its capacity, or when IHS funding is necessary to supplement alternate resources (e.g., Medicare) to ensure care for eligible Indians. Contract care may be delivered to individuals who are physically present in an IHS facility but, most frequently, the services are provided in non-IHS public or private facilities (168).

Since 1972, rates of increase in the IHS contract care budget have been less than those experienced in general health care costs (119), while the IHS service population has nearly doubled from 507,804 in 1972 to an estimated 961,582 in 1985. As a result, it has become increasingly difficult to meet the growing demand for contract care within available funding limits: it is not uncommon for a service unit to expend its entire contract care allocation well before the end of the fiscal year.

The IHS contract care program has applied various means in attempting to manage its limited annual resources. In addition to the required residence in a CHSDA, contract care authorizations are governed by a medical needs priority system that in some areas restricts care to emergency and life-threatening conditions (priority one) and denies referral for less urgent services due to lack

Table 5-16.—IHS Contract Care Program, Major Cost Centers as Percent of Total Disbursements,[a] by Area, Fiscal Year 1984

Cost centers	IHS total	Aberdeen	Alaska	Albuquerque	Bemidji	Billings	California	Nashville	Navajo	Oklahoma	Phoenix	Portland	Tucson
1. Patient and escort travel	3.1%	3.1%	3.4%	1.8%	0.6%	2.5%	—	—	9.8%	1.1%	4.8%	1.5%	0.7%
2. Dental care	4.1	1.8	4.2	6.0	4.1	2.2	0.3	0.2%	2.4	8.4	2.0	9.3	2.0
3. Inpatient care	46.8	66.2	37.2	53.1	20.5	73.4	—	9.8	31.8	51.3	58.7	42.5	37.6
4. Outpatient care	16.1	14.3	15.1	19.4	15.5	16.9	2.4	2.2	17.3	14.9	16.6	26.3	4.4
5. Other contract care	4.7	4.0	3.9	2.2	0.7	1.0	15.6	—	5.3	0.1	13.4	1.2	52.5
6. Contracts to support direct services	5.8	4.9	4.0	14.7	0.6	4.0	—	0.6	11.6	9.9	4.5	3.8	0.2
7. 638 contract care (incomplete)	19.4	5.7	32.2	2.8	58.0	—	81.7	87.2	21.8	14.3	—	15.4	2.6
IHS total contract care	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

[a] Based on total contract care program disbursements: full pay, partial pay, and unknown pay. There are substantial variations in how areas may report contract payments by cost center, especially line 6, contracts to support direct services, and line 7, tribal 638 contract care. Note also that data reported for 638 contract care are incomplete.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch, September 1985.

of funds. By regulation, the IHS contract care program may only pay charges that are not covered by Medicare, Medicaid, or any other third-party payers (42 CFR 36.23 (f)). Because there is no dollar cap on the amount that may be authorized for an individual contract care referral, and because there are no absolute constraints on the types of services that may be authorized, available funding is the major limiting factor.

The contract care headquarters office is responsible for overall program management. It establishes general administrative policies and standards of performance, develops long-term program plans and objectives, provides staff assistance to area offices, and administers funds to the areas to meet expenditures through the IHS financial management branch. The program's management philosophy is "to delegate to the greatest degree possible, within the limits of available funds, authority for the operation of the Contract Health Services Program to the Area Director and the Service Unit Director" (168).

The area offices are responsible for administering contract care services in accordance with headquarters policies and procedures. The area offices allocate funds among the service units and, in cooperation with them, negotiate annual provider contracts. It is the area offices that "establish medical priorities for the care of eligible Indian people that will most effectively meet their needs within the funds available" (168). Service unit directors and physicians determine on a case-by-case basis whether a specific request for contract care may be authorized within the area's contract health services priority guidelines and the limits of available funding. All requests must be acted upon, with written denials and maintenance of appeals files as appropriate. Service unit staff process patient referrals and payment authorizations, while area office staff provide invoice verification and claims processing services. Day-to-day operations of the contract care program follow the general steps outlined below (168):

1. *Contracting for Services*. Contracts are negotiated annually by the service units and area offices to cover services performed on a routine basis by private hospitals, clinics, laboratories, physicians, and other providers. When emergency or one-time services are authorized from a provider that is not an established contractor, individual purchase orders are used.
2. *Authorization for Contract Care*. For each contract provider utilized by an eligible Indian, a purchase order must be issued by the service unit director or a member of the medical staff. In emergencies, such authorization must be sought within 72 hours of admission; in nonemergency cases, authorization must be secured in advance. Service unit staff generally set up the approved appointments and prepare a formal authorization sheet, with identification of other sources of payment for which the patient may be eligible.

   The authorization form includes an estimated cost for the service. Because contract care is a budget-limited program, authorized estimated costs become obligated and reduce the available contract care funds balance for the service unit. Accurate estimates are critical, and it is important that actual disbursements be compared against the obligated estimates on a timely basis so that excess obligations may be deobligated to permit expenditure of those funds for additional services.

   Contract care authorizations for students, transients, and other eligible persons away from their home service delivery areas are the responsibility of the home service unit.
3. *Provider Invoices*. Upon performance of the services, the provider completes the authorization form, indicates the charges, and returns it to the service unit as an invoice. Actual charges are compared with the estimated obligation and adjustments made accordingly, taking into account applicable third-party resources. Documentation of the provider's attempts to obtain other payment should be verified locally. (IHS headquarters maintain no records of the verification of alternate resources. At the service unit level, each contract care authorization form indicates full pay by IHS or partial pay, and the amount paid by IHS, but the other payers usually are not identified.) Approved invoices are forwarded to the area office for

audit review, entry into the area data system, and check processing for payment.

IHS area and service unit staff are responsible for the day-to-day management of the contract care program. Because of differences in the availability of IHS facilities, levels of contract care funding, and the extent to which an area relies on contract care to supplement its direct delivery system, administration of the contract care program is not standard among the areas. Several areas have developed their own explicit program management policies and guidelines.

The particular services that may be authorized under contract health services priority guidelines vary among the areas. Decisions on what services will be purchased are made on a case-by-case basis in each service unit. A service that might be approved early in the quarter, when funds were available, might be denied when funds were running out or exhausted. When a service unit's contract care budget is depleted before the end of the fiscal year, it may apply to the area office for assistance; but it is not assured of getting any additional funding. When a patient's life is threatened, emergency contract care must be provided by a nearby private hospital that has no guarantee of being paid in a timely manner. Such bad debts can be a severe financial hardship on small rural hospitals, and can strain relations between IHS and those hospitals.

Issues Related to the IHS Contract Care Program

The Adequacy of Contract Care Funding and the Rationing of Care

The scope of services offered by many IHS hospitals is relatively limited compared with U.S. community hospitals in general; and because IHS cannot economically employ specialized medical staff in all service units (assuming such specialists could be recruited and retained), specialty services often must be obtained through the contract care program. The majority of the small IHS hospitals do not provide surgery, and they lack sophisticated diagnostic and therapeutic equipment as well as the specialized staff to operate it. These factors contribute to a demand for contract health services that is likely to increase and to put greater pressures on area contract care budgets, especially if those budgets experience little or no growth. The volumes of contract services purchased in recent years have shown a level or declining trend because general health care cost inflation has increased service charges more rapidly than the IHS contract care budget has grown. Under these circumstances, how should IHS balance its direct and contract care services to achieve maximum cost-effectiveness? It may be more expensive to purchase services through contract care than for IHS to provide them directly, where IHS is capable of doing so; but direct care delivery requires capital and staffing investments that cannot be justified in many isolated IHS areas.

When the demand for contract services exceeds available funding, IHS contract care programs in the areas and service units must ration services in order to operate within fixed annual budgets. The means by which services are rationed include application of the contract care eligibility requirements, authorization of services according to the medical priority system (which may differ from one IHS area to another), and the required first use of alternate resources.

Medical urgency determinations are made by a physician or by the service unit director within the guidelines of the area's contract health services priority system. That system defines some, but not all, of the medical conditions that are considered emergencies and that should receive first priority for contract care referral. Urgent nonemergency services and elective procedures may be provided if sufficient funds are available, but if not, they may be deferred or not provided at all.

Because this medical priority system tends to refer out the more specialized and expensive inpatient cases, the contract care budget gradually is becoming a high-cost care fund and its original purpose of supplementing the full range of IHS direct care services is being lost. (The effects of especially high-cost cases on the contract care program are discussed in ch. 6.) When no IHS direct care facilities are available, patients may face long waits for elective and urgent care that must be obtained under contract. Serious medical conditions may be aggravated during the wait, and some patients may fail to seek and obtain needed services altogether. Although in recent years some of the areas have maintained lists of deferred contract care needs, whether or not patients receive the deferred services depends on the state of the area's contract care budget at the end of the fiscal year.

IHS's methods for allocating and administering contract care resources over the years have resulted in inevitable inequities among IHS areas, service units, and individual beneficiaries. Both the 1976 American Indian Policy Review Commission and the Grace Commission cited inequities in the range of health services available to eligible Indians, based on residence. The 1976 commission concluded that the contract care program contributed to the maldistribution of resources because the extent to which the areas depended on contract funding for overall clinical services delivery varied so much (128).

Contract care funds purchase services to supplement those available from the IHS direct care system of hospitals and clinics. In areas with relatively comprehensive direct care resources, this principle may work reasonably well even under current funding constraints because direct service capabilities are there to back up the contract care program and provide some of the services that cannot be purchased because of a lack of contract care funds. A patient with an urgent but not life-threatening condition (such as the need for gall bladder surgery) might not receive the needed care in an area authorizing only priority one (emergency and life-threatening) contract services; but care might be authorized in another area where funding was less restricted. Or, the patient could travel to the nearest IHS hospital and receive services that were denied under contract care, if the hospital did not have an extensive waiting list for the service. In the Portland and California areas, however, this is not an option because there are no IHS hospitals.

Another aspect of the overall funding problem is a perceived vulnerability of the contract care program to budget cuts, relative to the more difficult task, politically, of closing existing IHS facilities and laying off staff to reduce the direct care budget. Areas dependent on contract care believe that they already receive fewer services than direct care areas, and they fear they are at greater risk of absorbing service cutbacks due to reduced contract care funding. Again, Portland is an example of an IHS area where contract care budget cuts could have serious effects, because nearly half of the clinical services funding in that area is for contract care.

Neither the California nor the Portland IHS area receives compensatory contract care funding to offset the absence of direct care capabilities. It is difficult to dispute the contention of tribes in those areas that they are not receiving their fair share of total IHS resources in comparison with IHS direct care areas like Navajo, Oklahoma, Albuquerque, and others. The idea that some adjustment should be made in contract care relative to direct care funding, or that a clinical services resource allocation formula should be developed to reflect combined direct and contract care needs, has been proposed but not implemented (182). This would be one way to work toward a more comparable services package among IHS areas.

The Use of Alternate Resources

By regulation, the IHS contract care program is designated as the residual payer, or payer of last resort, for eligible Indians who have access to other sources of reimbursement or health care delivery (42 CFR 36.23 (f)). The identification of these so-called alternate resources and aggressive efforts to collect appropriate reimbursements from them are vital to the contract care program, in which funds are so limited. Chapter 3 of the IHS *Indian Health Manual* defines alternate resources (third-party payers and providers) as "those resources, including IHS facilities, that are available and accessible to an individual. Alternate resources would include but not be limited to, Medicare, Medicaid, vocational rehabilitation, Veterans Administration, crippled children, private insurance, and State programs" (168).

In the contract care program, the use of alternate resources is mandatory: that is, an individual is required to apply for an alternate resource if there is a reasonable chance that he or she may be eligible for coverage, and IHS disbursements are authorized only for charges not covered by other payers. The numbers of IHS beneficiaries eligible for and/or enrolled in Medicare, Medicaid, and other third-party payers, however, are not known with accuracy. There is no IHS data system that maintains records of eligibility for alternate resources, although the patient registration system that has been implemented since January 1984 may help to fill this gap in the future. Each individual who presents himself for treatment at an IHS facility (or who seeks a contract care referral through the facility) now must register for services and be screened for eligibility for third-party resources.

Some IHS areas have set up their own manual or automated systems for identifying alternate resources. In the Portland area, for example, the contract care program is monitored closely by the area office. Since 1983, alternate resource utilization targets based on actual collections experience have been established for each service unit and reviewed quarterly. The targets, which reflect differences in tribal population characteristics (especially age distributions) and the availability of other resources such as State Medicaid programs, range from an expected 30 to 50 percent of contract care charges that should be collected from non-IHS payers (46).

Data from the U.S. Census Bureau's 1980 supplementary survey of American Indians, Eskimos, and Aleuts provide the only national estimates of other sources of payment for health services. However, those data refer only to Indians residing on reservations and in historic areas of Oklahoma (336,000 out of a 1980 total self-identified Indian population of 1.4 million and an IHS estimated eligible service population of 829,000) and cannot be generalized with confidence to other Indian populations. Data from the census survey suggested that about 85 percent of the reservation-based Indians had received some type of health service during 1979. Eighty percent of those service users reported that their usual place of treatment was an IHS facility; for 11 percent, the delivery site was a private physician's or dentist's office; and for 5 percent, it was a tribal clinic or hospital. Eighty-four percent of service users reported that their recent services had been paid for by IHS (including IHS contract care and tribal 638 health programs), nearly 5 percent of the services were paid by private insurance, 5 percent by the recipient or recipient's family, and 3 percent by Medicare or Medicaid (147).

It is surprising that only 3 percent of the Indian service users reported their care had been paid for by Medicare or Medicaid, especially in view of other census data showing that of Indians 15 years of age and older, 7.3 percent reported receiving benefits from Medicare or Medicaid, an additional 12 percent reported social security benefits, and 6.6 percent received BIA general assistance. It is possible that when an IHS facility is the first point of contact, it is assumed that IHS pays for the care, although this may not be the case if IHS can collect reimbursement from Medicare, Medicaid, and other payers (147).

IHS pursues two approaches in its efforts to make full use of alternate resources. First, services may be provided in IHS facilities to Indians who are eligible both for IHS care and for Medicare, Medicaid, private insurance, or other coverage. In such cases, IHS seeks reimbursements from those other sources before absorbing the costs in its direct care budget. In a second situation that affects the contract care program, an IHS-eligible Indian also having other sources of payment may be referred for care to a non-IHS provider. IHS then must verify that all other applicable sources have paid their shares before the IHS contract care program can pay the remainder of the bills. If the individual has no other source of payment, IHS is responsible for the full charges.

IHS officials report that collections from Medicare for services provided in IHS facilities to Indians who also are Medicare beneficiaries proceed relatively smoothly. IHS has been reimbursed under the Medicare prospective payment diagnosis-related group (DRG) system since October 1983. Likewise, Medicare payments associated with contract care referrals are not a problem as long as the private provider is aware of the patient's Medicare eligibility and bills Medicare on behalf of that patient. IHS direct and contract care programs have found it more difficult to collect from State Medicaid programs, however, primarily because of problems in ensuring that all Medicaid-eligible Indians are enrolled. IHS must deal with different and changing Medicaid eligibility and coverage requirements in each State, and State Medicaid programs, which are under budgetary pressures of their own, have little incentive to encourage Indian enrollment (70).

Non-IHS private hospitals and physicians that treat IHS contract care patients should bill private third-party insurers, in addition to Medicare and Medicaid, before submitting bills for any remainder to IHS. Service unit contract care staff are responsible for veryifying that all other appropriate payments have been made before authorizing contract care disbursements. IHS collections from private payers for services delivered in IHS facilities pose other problems: because individual Indians are not billed and are not legally liable for the costs of their medical care, their private insurers likewise cannot be held liable. Thus IHS usually is not able to collect reimbursements for such care from an Indian's private insurance company. In spite of these difficulties, IHS has been directed to continue to pursue all possible third-party reimbursements (60).

The fiscal year 1985 IHS appropriations briefing book cited unidentified preliminary data indicating that "less than 2 percent of the Indian population have private insurance" (162). Even in view of high unemployment among Indians and other factors, this figure seems quite low. One Federal official familiar with the program estimates that at least 5 to 10 percent of Indians have private insurance, because Indian employees of the Federal Government alone would account for more than 2 percent (83). IHS states that a study is underway to generate better data on this question.

Reimbursements from Medicare, Medicaid, and private payers are used primarily to upgrade hospital and clinic facilities or equipment and to hire temporary staff. The amounts of reimbursements collected vary among IHS areas. Those that are most dependent on contract care may of necessity be more active in third-party collections than IHS areas where pressures on contract care funds are not so great. Some areas express fears that third-party collections will be used to offset their regular budget allocations. Furthermore, aggressive third-party collections are discouraged if the funds are not available to the service unit where they were collected. Title IV of the Indian Health Care Improvement Act provided that third-party collections would be held in a special DHHS level fund for redistribution as needed to upgrade facilities and services, but some areas and service units complained that they received less than they had collected. The 1985 amendments proposed that each service unit be able to use at least 50 percent of the amount it collected, but that legislation had not been enacted by the end of 1985. At the least, clarification of whether third-party collections will be treated as offset or supplemental funds for budget allocation purposes could encourage greater collection efforts.

In order to utilize alternate resources most effectively, the IHS contract care program must be able to respond to changes in the general health care delivery environment that will affect its beneficiaries. Changes in State Medicaid programs can have significant effects on IHS contract care programs. In the State of Washington, for example, a health program for the medically indigent that served a large number of Indians was discontinued for about 6 months in 1985. The Portland area IHS office estimated that if the program were not reinstated (it was reinstated in October 1985, but its future still was uncertain), additional costs to the IHS contract care program would total at least $2 million per year (107). Indians in the State of California have relied on the relatively generous MediCal system for a large volume of services, especially hospital services, that California IHS contract care programs often cannot afford. Recent implementation of a Medicaid program in the State of Arizona, the Arizona Health Care Cost Containment System, has brought about a major realignment of IHS, county, and State health programs available to Indians.

IHS contract care programs must keep current of changes in State Medicaid programs in order to encourage all eligible Indians to enroll and maintain eligibility in those programs. In Minnesota, the Medicaid program recently required that all Medicaid beneficiaries be treated in State-qualified health maintenance organizations. How this new requirement will affect services delivery to Medicaid-enrolled Minnesota Indians is not yet known. The Minneapolis urban Indian health project, for example, which serves both Indians and non-Indians who are covered by Medicaid, is not a health maintenance organization, but in order to continue serving its Medicaid-eligible clients, it joined a network of qualified health maintenance organizations.

The question of whether IHS and tribally operated facilities should treat and bill non-Indians raises other issues involving appropriate relations between IHS and the alternate resources. Indian health facilities serve non-Indians in Alaska, where IHS facilities are the only health services available in some areas. Some tribal 638 health programs in California serve non-Indians, as do some urban Indian projects. The practice is not prohibited by IHS, as long as there are assurances that Federal funds destined for Indians are not spent to care for non-Indians. In some IHS facilities, Indian users do not want their facility to treat non-Indians.

Management Efficiency in the Contract Care Program

The use of contract care and private resources represents a growing portion of IHS clinical services delivery, and, as a number of recent studies have pointed out, there are questions as to whether IHS management techniques have kept pace with program growth. Under current budget constraints, it is of critical concern that IHS's purchase of contract services be as cost-effective as possible. Questions have been raised about program management policies that allow the payment of IHS contract care funds to private providers on terms that are not always advantageous to IHS and that ultimately may reduce the volume of contract services purchased.

Management of the IHS contract care program has been reviewed by the American Indian Policy Review Commission's task force on Indian health, 1976 (128); a General Accounting Office (GAO) study of contract care claims processing, 1982 (132a); the Grace Commission's private sector survey on cost control, 1982 (119); the IHS Director's Contract Health Services Task Force, 1983 (181); and a Macro Systems study of fiscal intermediary costs, 1984 (69).

Among potential problems in the IHS contract care program identified by these studies were the following: 1) IHS pays 100 percent of charges billed instead of the 80 percent of customary fees usually covered by private insurors; 2) the contract care program does not reimburse its vendors at Medicare DRG rates, although it receives its reimbursements from Medicare based on DRGs; 3) in some areas there is a lack of aggressive competitive bidding for IHS contracts and of forceful negotiations for reduced charges; 4) IHS processes its own contract care claims instead of using a fiscal intermediary or billing agency at potentially lower cost; and 5) procurement policies and cost accountability in IHS area offices and service units, where the contract care program is administered, could be improved with more experienced staff and computer capabilities.

There seems to be agreement that IHS should negotiate more aggressively, where it can, to obtain better prices for the services it purchases. Instead of paying 100 percent of billed charges, the contract care program could bargain for reduced fees and encourage competition among contract providers wherever possible. In some geographic areas, IHS does not represent a sufficient share of the health services market to negotiate effectively for reduced rates; elsewhere, the lack of alternate providers may eliminate the effects of competition; but these limitations do not exist everywhere.

The GAO study recommended that IHS contract providers be reimbursed at Medicare rates rather than at 100 percent of the amount billed, as has been IHS practice (132a). This recommendation was supported by the Director's Task Force on Contract Health Services and by the Grace Commission report, both of which called for a uniform, standardized IHS rate structure based on Medicare and the use of Medicare intermediaries for claims processing. Use of a Medicare-based rate structure, such as DRG rates, would generate substantial savings for the IHS contract care program. One way to implement Medicare rates in IHS would be to make acceptance of those rates for IHS patients a condition of Medicare program participation. This approach would require legislation and is not under active consideration. Another approach that IHS was considering at the end of 1985 was the issuance of a "general notice," which is provided for under Federal contracting procedures and would not require formal rulemaking. The notice to prospective contractors would state that IHS would refer patients only to private providers with which it had contracts, and that it would enter into such contracts only if the contractor agreed to accept payment at no more than Medicare-allowable rates. IHS still would be the last or residual payer, but if IHS were the only payer, it would pay 100 percent rather than the usual 80 percent of the Medicare-allowable rate. Emergency services provided by noncontract sources would be paid at full billed charges. IHS officials have stated that the problem of obtaining more favorable contract care rates is not so much one of authority as of inadequate leverage, and it is hoped that the terms specified in the proposed general notice may improve IHS's position in negotiating with contractors (78).

The use of fiscal intermediaries and carriers for IHS contract care claims processing also has been recommended. In addition to reducing the costs of claims processing by taking advantage of existing automated systems, it was suggested that experienced fiscal intermediary staff could perform the essential steps of identifying and verifying third-party resources for each claim. More efficient invoice processing could reduce duplicate payments and other errors. GAO, the Grace Commission, and the contract health services task force all supported this recommendation, and IHS was directed to explore its potential costs and savings. An analysis completed in March 1984 suggested that IHS could process claims more efficiently and at lower cost by retaining the function in-house (69). IHS officials also have pointed out that legislation would be necessary to permit IHS to delegate its responsibility for determining eligibility for services to an outside party such as a fiscal intermediary (78).

The Grace Commission in 1982 noted variations in claims processing policies and procedures among IHS areas and service units. Third-party resources usually were identified, but verification of provider invoices relative to claims filed was inconsistent. Too many people were involved in the largely manual claims processing system, and there was a general lack of uniformity in procedures and of adequate controls throughout the system. One processing problem was the failure to deobligate on a timely basis unused funds set aside in service unit contract care budgets for authorized services. Excessive withholding of obligated reserves reduced the funds available for new referrals. In addition, more than one study mentioned a variety of deficiencies in contract care program procurement policies (119).

Conclusions

The contract care program is an essential component of IHS clinical services delivery because it purchases services that IHS facilities and staff cannot provide directly. Contract care now represents about 20 percent of the total IHS budget and 25 percent of the clinical services budget nationally, although those figures vary considerably among IHS areas.

Contract care allocations among the areas are determined by the same program continuity budget methods that are applied to IHS direct services: that is, each area's share of the annual appropriation is approximately the same from year to year. Contract care funding does not reflect need, in terms of what cannot be provided by IHS direct facilities, or demand, as expressed by actual requests for contract service authorizations. Although it has been suggested that contract care funding might be adjusted to compensate areas that have relatively limited direct care facilities and that a combined direct/contract care resource allocation formula might incorporate such a compensation factor, there has been no action on such proposals. Because the types and amounts of IHS direct services vary considerably among the areas and because contract care programs supplement the services that IHS facilities provide directly, the mix of services covered by contract care likewise is different in each IHS area. The private resources that are available as potential contractors in a given area also affect the contract services package.

In recent years, increases in annual contract care appropriations have been less than rates of general health cost inflation. As a result, the pressures of funding constraints are mounting, and the IHS contract care program currently is rationing services in several ways: 1) contract care eligibility criteria are more restrictive than criteria for IHS direct services; 2) services may be authorized only according to each area's medical needs priority system; and 3) all other payers must be tapped before IHS can pay the remainder of a bill (the residual payer principle). The primary rationing force behind these policies is the limitation of annual area and service unit contract care budgets, the effects of which are felt more severely in some areas than in others.

Funding levels, management policies, and contract care utilization patterns vary substantially among IHS areas, aggravating inequities in resource allocations and in the services available to eligible Indian residents in the 12 areas. Management of the contract care program, including budget management and the necessary rationing of services, is implemented at the service unit and IHS area levels within general guidelines from IHS headquarters. The contract care program is particularly difficult to manage at the immediate service unit level, where budgets have the least flexibility, the incidence rates of particular diseases and conditions are most variable, referral decisions must be made on a case-by-case basis, and unexpectedly high-cost contract referrals can severely dislocate budget management plans. The level of service unit staff expertise and the quality of supporting data systems also affect program administration. In addition, the IHS contract care program does not permit the carryover of funds from one fiscal year to the next (although tribal 638 contract care programs do have that option), which further limits the ability to manage the program effectively. Instead, services may be restricted too severely early in the fiscal year in order to conserve funds, and then at the end of the year virtually any service request may be authorized, including previously deferred services, to close out the budget. Provision to carry over a certain percent of the annual allocation, perhaps 5 or 10 percent, could ease this problem.

Some IHS area offices have established formal, centralized contract care program management policies, including systems to monitor performance in all service units. In some areas, such efforts are supported by large, labor-intensive manual data systems, although automated systems clearly are needed (for example, the Portland IHS area manages its contract care program, which represents half of its total clinical services budget or nearly $19 million, with manual systems). Procedures to ensure that all applicable payments have been made by alternate resources (third-party payers), a critical part of contract care management, also vary depending on area office leadership, staff capabilities and, perhaps, the importance of contract services in the areawide delivery system. The mandatory use of alternate resources may require substantial efforts by service unit staff to encourage all eligible Indians to enroll in Medicaid and other programs, and then to verify and process claims applicable to those programs. Greater assistance from area office staff could relieve the service units of some of the burden of dealing with many outside providers.

It is not likely that IHS's annual appropriations will increase substantially in the immediate future. Growth in the contract care appropriation since 1980 has averaged about 10 percent per year (although there have been wide variations in budget growth from year to year, as shown in app. C), which is somewhat below average annual inflation in general health care costs. Over the same period, while numbers of IHS direct care inpatient admissions and outpatient visits remained relatively constant or increased slightly, inpatient admissions and outpatient medical visits authorized by the contract care program each declined by approximately 6 to 7 percent per year (191). The average number of patients being treated daily in IHS direct care hospitals has declined only slightly since 1980, from 1,178 to 1,072 inpatients per day (a decline of 9 percent); but the average daily census of contract care patients has declined from 398 in 1980 to 281 in 1984, or by nearly 30 percent (191).

That inpatient utilization has declined substantially while the overall contract care appropriation has continued to grow (even if at rates below general health inflation) raises questions about increases in inpatient per diem charges to the contract care program, by area, compared with such increases in other groups of U.S. community hospitals. In spite of the effects of generally declining average lengths of stay, when these utilization trends are viewed against the background of a 16-percent growth in the IHS eligible service population since 1980, they suggest that budgetary restraints are limiting the services delivered by IHS and, in particular, by the IHS contract care program. This conclusion is supported by reports from the field that contract care programs have been forced by budget limitations to authorize services primarily for medical emergencies and life-threatening conditions, while necessary but less urgent services are deferred or denied. Declining utilization of the contract care program appears to reflect funding limitations, rather than any actual decline in the need or demand for contract services (although demand, too, may decline if there is little likelihood of obtaining care).

In spite of recently declining utilization, several factors suggest that in the future, IHS of necessity may become increasingly reliant on the contract care program. The present IHS network of direct care hospitals and clinics is limited in the types of services it can provide, and budgetary limits increasingly restrict new facility construction, the replacement of old and inadequate facilities, and needed maintenance and repair for existing facilities. Diagnostic and therapeutic equipment purchases are limited, further reducing service delivery capabilities. As the older IHS hospitals and clinics deteriorate, it is not likely that they will either be maintained or replaced as has been the practice in the past. This situation is due to the overall budget situation and, in part, to the practical limitations of delivering comprehensive and specialty services to many widely dispersed small population groups. It may in fact be more cost-effective for IHS to discontinue the provision of extensive inpatient services in its own facilities, to contract for more of its inpatient care, and to concentrate IHS direct delivery on outpatient clinic facilities and services.

A critical factor that may orient IHS toward increased contracting in the near future is the growing problem of how to recruit and retain adequate medical staff. IHS depends for physicians, nurses, and other medical and administrative staff on the PHS Commissioned Corps, which is not a growing resource, and on the service payback obligations of NHSC trainees. The NHSC program is being eliminated, and the last few NHSC scholars will be assigned to IHS in 1990. It is not clear how IHS anticipates meeting this loss of professional staff. If IHS direct care staff positions cannot be filled, there would appear to be little alternative but to turn to the services of private providers, where they exist, under the contract care program.

If IHS is going to continue to provide a comprehensive range of health services to American Indians, it seems likely that it will have to rely increasingly on the contract care program. This may be especially true for inpatient services, except in areas so isolated that no private resources are available for contracting. As a result, the contract care program may claim an increasing share of the IHS clinical services budget and may compete more intensely with direct care hospitals and clinics for funding. At current low rates of utilization in most IHS hospitals, averaging only about 50 percent occupancy, their continued existence will be hard to justify except where no alternative facilities exist.

Whether greater reliance on contract care will increase or decrease the overall costs of health care delivery for Indians cannot be determined at this time. Much will depend on IHS's ability to manage contract care efficiently. Current administrative systems, levels of staff expertise, data systems support, and headquarters guidance and technical assistance devoted to contract care might not be adequate to manage a greatly expanded program. Because of the decentralized IHS structure, headquarters has not taken the initiative in helping areas and service units to resolve their contract care management problems.

Management policies that could maximize the purchase of contract care services (some of these techniques would be difficult to implement on the small scale of the service unit) have been noted earlier in this section: payments to private contractors at rates more comparable to those paid by other buyers, i.e., 80 percent of Medicare-allowable or Medicare DRG rates, rather than payments of 100 percent of billed charges; encouragement of competition among providers and more aggressive negotiations for reasonable or discount service charges, where possible; automated systems to track and monitor contract care obligations and claims processing; and IHS area or headquarters support in resolving the legal and operational problems of dealing with many different alternate resources, both public (especially State Medicaid programs) and private. Authorization to carry over funds from one fiscal year to another has been mentioned as a possible means of assisting contract care program managers to use their limited resources more effectively. The planning and management difficulties inherent in uncertain annual appropriation levels cannot be avoided entirely in the present system, but more serious efforts at assessing health services needs and planning services, and particularly in the coordination of services available through the direct and contract programs, could contribute to more cost-effective services delivery.

At the same time, however, given expected rates of increase in general health care costs relative to likely IHS budget increases, even the most efficient management techniques may not be enough to overcome the problems of inadequate funding and a growing service population. Current methods of rationing limited contract care funds create inequities in the services that may be provided to individual beneficiaries living in different IHS areas and service units. Beyond these equity problems, the central policy and management question involves identifying and implementing the most cost-effective balance of IHS direct and contract services, and the appropriate mix of direct and contract services will be different in each IHS area because of differences in available direct and alternate resources.

As IHS contract care budgets are increasingly stressed, IHS will have to become more aggressive and efficient in collecting applicable third-party reimbursements for services provided to eligible Indians both in IHS facilities and by private providers under contract. Increased collections will tend to shift the costs of health care for Indians to State, county, and local programs, increasing existing conflicts over which level of government is ultimately responsible for Indian health.

The IHS contract care program relates to a wide range of other public and private health providers. Changes in the general health care delivery environment affect IHS contract care, and IHS should monitor such changes to anticipate how its contract care program can best respond to them. Changes in eligibility criteria and in the range of services covered by State Medicaid programs, which have been implemented in a number of States recently to slow the growth in Medicaid expenditures, can have immediate and substantial effects on local IHS contract care programs. The non-Indian health care delivery system in the United States is under increasing financial stress, and future limitations in other public health programs and in private provider obligations for charity care may reduce the extent to which alternate resources are available to relieve pressures within the IHS contract care program. Although IHS cannot prevent such changes, it should be prepared to respond to them.

URBAN INDIAN HEALTH PROJECTS

According to the 1980 U.S. census, almost two-thirds of all Indians lived off reservations, tribal trust lands, or other Indian lands. Of all identified American Indians, Eskimos, and Aleuts in 1980, 24 percent lived on reservations, 8 percent in historic areas of Oklahoma (excluding urbanized areas), 3 percent lived in Alaska Native villages, 2 percent on tribal trust lands, and 63 percent lived in the remainder of the United States (148). Part of the growth in off-reservation residency can be attributed to past Federal policies such as allotment and termination (see ch. 2) in addition to the changing nature of reservations and the economic developments surrounding them. Incentives for Indians to move and stay away from their homelands exist, for example, if traditional forms of subsistence are diminished because the carrying capacity of reservation lands has approached an upper limit or because of the loss of fishing or hunting resources; if there is little or no chance of earning a living wage or maintaining gainful employment; if the educational system is viewed as inferior; or if the social climate is unacceptable or dangerous. With an unemployment rate of 27.8 percent on all reservations in 1979 (152), it is not surprising that more and more Indians are choosing to reside off of reservations, where opportunities to work are greater.

Funding for Urban Indian Health Initiatives

In the early 1970s, the Federal Government became increasingly interested in programs to assist urban Indians. President Nixon's special message to Congress on Indian Affairs stated: "BIA's responsibility does not extend to Indians who have left the reservation, but this point is not always clearly understood. As a result of this misconception, Indians living in urban areas have often lost out on the opportunity to participate in other programs designed for disadvantaged groups" (94). The Office of Economic Opportunity was directed to lead an effort by four Federal departments and agencies to alleviate the problems faced by urban Indians, for example, by supporting existing Indian centers in major cities as links between urban Indians and various government programs.

In 1972, IHS began to fund urban programs through its community development branch under the general authority of the Snyder Act. Since then, 42 different projects have received financial support from IHS. The Indian Health Care Improvement Act of 1976 explicitly authorized urban Indian organizations to contract with IHS to operate health centers and to increase Indian access to public assistance programs. In 1984, there were 37 urban programs in 20 States funded by IHS (see table 5-17). Staffing for the urban programs is shown in table 5-18.

Urban health projects are distinguished from IHS's reservation-based clinics by their emphasis on increasing access to existing services funded by other public and private sources rather than providing or paying for services directly. The average number of funding sources for the 37 urban programs was 5.3 in fiscal year 1984. Two urban programs, both well established, had more than 10 sources of support each. At the other end of the spectrum, five programs relied solely on IHS for funding. Fifty-one percent of total urban program funding was provided by IHS. Forty-six percent of the remainder came from other Federal sources including the Community Health Centers program, Maternal and Child Health, the Administration for Native Americans, Women Infants and Children, and Medicare. Although only four programs received funds from the Community Health Centers program, this $1.6 million comprised 9.1 percent of total funding. State Medicaid programs represented 3 percent of urban program revenues (184).

Out-of-pocket and private insurance collections and private grants have been important sources of income to the urban programs, although in fiscal year 1984, only 5.6 percent of total funds were obtained from patient collections and 4.4 percent

Table 5-17.—IHS-Supported Urban Indian Health Programs, by State, Fiscal Year 1984

State	Location	State	Location
1. Arizona	Phoenix	20.	Great Falls
2.	Tucson	21.	Helena
3. California	Bakersfield	22.	Miles City
4.	Compton	23.	Missoula
5.	Fresno	24. Nebraska	Omaha
6.	Sacramento	25. New Mexico	Albuquerque
7.	San Diego	26. Nevada	Reno
8.	San Francisco/Oakland	27. New York	New York
9.	San Jose	28. Oklahoma	Tulsa
10.	Santa Barbara	29.	Oklahoma City
11. Colorado	Denver	30. Oregon	Portland
12. Illinois	Chicago	31. South Dakota	Pierre
13. Kansas	Wichita	32. Texas	Dallas
14. Massachusetts	Boston	33. Utah	Salt Lake City
15. Michigan	Detroit	34. Washington	Seattle
16. Minnesota	Minneapolis	35.	Spokane
17. Montana	Anaconda	36. Wisconsin	Green Bay
18.	Billings	37.	Milwaukee
19.	Butte		

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, "Major Health Facilities for Indians and Alaska Natives," listing urban Indian health programs by State, 1984.

Table 5-18.—Urban Indian Health Program Staff Profile, Full-Time Equivalents, Fiscal Year 1983

Program	Medical or dental	Other staff	Total staff	Indian (percent)
All programs	112.5	479.2	591.6	59.3%
Albuquerque, NM	0.5	8.0	8.5	11.8
Anaconda, MT	—	1.0	1.0	100.0
Bakersfield, CA	0.5	7.8	8.3	60.2
Billings, MT	0.4	3.0	3.4	88.2
Boston, MA	0.7	14.1	14.8	81.1
Butte, MT	—	1.0	1.0	100.0
Chicago, IL	0.2	4.8	5.0	80.0
Compton, CA	9.8	29.5	39.3	31.0
Dallas, TX	4.9	21.8	26.7	73.0
Denver, CO	1.4	7.0	8.4	73.8
Detroit, MI	0.6	9.3	9.9	85.9
Fresno, CA	3.5	9.8	13.3	51.1
Great Falls, MT	3.0	1.5	4.5	77.8
Green Bay, WI	—	9.1	9.1	100.0
Helena, MT	1.7	0.8	2.5	40.0
Miles City, MT	—	2.0	2.0	100.0
Milwaukee, WI	11.0	48.0	59.0	38.1
Minneapolis, MN	5.3	60.6	65.9	58.6
Missoula, MT	—	2.6	2.6	100.0
New York, NY	1.0	8.0	9.0	88.9
Oklahoma City, OK	5.4	9.8	15.2	65.8
Phoenix, AZ	—	7.0	7.0	78.6
Pierre, SD	4.5	3.5	8.0	62.5
Portland, OR	3.7	12.9	16.6	65.1
Reno, NV	1.0	5.3	6.3	31.7
Sacramento, CA	5.0	19.0	24.0	66.7
Salt Lake City, UT	2.1	7.5	9.6	55.2
San Diego, CA	3.5	7.0	10.5	57.1
San Francisco, CA	8.6	28.0	36.6	65.6
San Jose, CA	2.6	8.2	10.8	27.8
Santa Barbara, CA	4.0	8.1	12.1	24.8
Seattle, WA	14.2	64.0	78.2	70.1
Spokane, WA	4.2	11.6	15.8	55.1
Tucson, AZ	2.0	2.2	4.2	52.4
Tulsa, OK	5.1	24.6	29.7	68.7
Wichita, KS	2.0	10.8	12.8	53.1%

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Division of Health Systems Development, *Urban Indian Health Program Evaluation Project, Fiscal Year 1983* (Tucson, AZ: IHS, February 1984), table 5.

from private grants. An average 17 percent of Indian clients across all programs had some form of private health insurance, but the extent of coverage and ability to meet deductible and copayment requirements is not known (138). Twenty, or 55 percent, of all urban programs request some form of payment from their clients (184). The programs do not require payment for services, however, and sliding fee scales are used to determine the amount requested of clients. A complete account of funding sources and allocation of costs for the urban programs is provided in tables 5-19 and 5-20.

In order to receive IHS support for an urban Indian health project, an organization must submit an application. Criteria that IHS applies to make funding determinations on the urban programs include attention to cultural barriers, conditions discriminating against Indians, inability to pay for health care, lack of facilities providing free care to indigent persons, lack of State or local health programs, technical barriers created by State and local health agencies, availability of transportation to health care services, and distance between Indian residences and the nearest health care facility (42 CFR 36.351). Funding for specific programs has taken into consideration the extent of unmet health needs in the urban community, as determined by the incidence and prevalence of disease, life expectancy, infant mortality, dental needs, housing conditions, family income, and employment status. There have been no new urban Indian health projects established in the past few years. Projects that have been in existence longer and have had time to strengthen their organizations tend to receive a greater proportion of IHS's allocation for urban Indian health projects.

Two other important factors in determining funding priorities are the Indian population in urban centers and whether the city has an existing urban Indian health program. With respect to population, there are five levels of priority, with greatest preference given to cities with more than 9,000 Indians and lowest preference given to localities with fewer than 1,000 Indians (42 CFR 36.351). The 1980 census identified 114 out of 318 Standard Metropolitan Statistical Areas (SMSAs) as having more than 1,000 American Indians, Eskimos, and Aleuts (see table 5-21). Two of the four largest urban Indian health programs supported by IHS are located in SMSAs that ranked eighth and ninth on the list of SMSAs with the largest numbers of Indians; however, 7 of the 37 projects funded in fiscal year 1984 served Indians in communities that had fewer than 1,000 Indian inhabitants in the 1980 census, and 3 programs were located in cities with an IHS hospital or clinic in close proximity.

Table 5-19.—IHS-Funded Urban Indian Health Programs, Fiscal Year 1984: Distribution of Reported Revenues in Dollars, by Source and by Program

Program	Total	CHC Sec 330	MCH	Title X	WIC	Other Federal	IHS Title V	IHS other	Medicare	Medicaid	Other 3d party	Patient collections	State	County	City	Other
All programs	$17,517,838	$1,595,143	$294,233	$108,502	$645,979	$1,234,015	$7,928,531	$929,533	$97,154	$590,478	$546,390	$980,502	$1,139,454	$508,967	$144,671	$774,286
Percent by source	100.0%	9.11%	1.68%	0.62%	3.69%	7.04%	45.26%	5.31%	0.55%	3.37%	3.12%	5.60%	6.50%	2.91%	0.83%	4.42%
Albuquerque, NM	111,519	—	—	—	13,020	—	98,499	—	—	—	—	—	—	—	—	—
Anaconda, MT	30,429	—	—	—	—	—	30,429	—	—	—	—	—	—	—	—	—
Bakersfield, CA	140,690	—	—	—	—	3,738	118,216	—	—	—	18,736	—	—	—	—	—
Billings, MT	77,012	—	—	—	—	—	77,012	—	—	—	—	—	—	—	—	—
Boston, MA	349,014	—	—	—	—	10,603	96,574	217,700	—	—	—	—	22,257	—	1,880	—
Butte, MT	37,543	—	—	—	—	—	37,543	—	—	—	—	—	—	—	—	—
Chicago, IL	179,771	—	—	—	—	—	137,992	—	—	2,274	13,319	6,197	—	—	—	19,539
Compton, CA	1,539,410	—	—	106,002	56,699	—	548,676	287,078	—	—	192,000	—	183,194	165,761	—	—
Dallas, TX	1,121,760	—	—	—	92,844	642,675	357,226	—	—	—	—	24,390	—	—	—	4,625
Denver, CO	222,027	—	—	—	—	—	183,147	—	—	—	—	—	—	—	13,000	25,880
Detroit, MI	231,856	—	11,906	—	—	—	193,000	—	300	1,500	50	100	—	—	25,000	—
Fresno, CA	494,556	—	50,000	—	88,020	—	175,436	—	—	21,553	—	44,481	99,565	—	—	15,501
Great Falls, MT	101,494	—	—	—	—	—	101,494	—	—	—	—	—	—	—	—	—
Green Bay, WI	183,364	—	—	—	—	—	129,000	—	—	—	—	—	2,063	30,500	—	21,801
Helena, MT	92,229	—	—	—	—	—	64,620	—	—	2,589	1,869	3,604	19,547	—	—	—
Miles City, MT	109,909	—	—	—	—	68,780	41,129	—	—	—	—	—	—	—	—	—
Milwaukee, WI	2,138,713	864,414	43,459	—	72,146	246,737	389,232	31,688	15,100	251,400	72,962	91,000	—	—	—	60,575
Minneapolis, MN	1,432,838	328,451	—	—	—	—	588,899	—	—	—	—	292,190	10,875	57,654	27,524	127,245
Missoula, MT	129,798	—	—	—	—	20,000	59,790	—	—	—	—	—	—	13,000	—	37,008
New York, NY	316,000	—	—	—	—	17,000	119,000	30,000	—	—	—	—	90,000	—	60,000	—
Oklahoma City, OK	517,600	—	—	—	—	—	463,000	—	643	390	370	26,890	15,057	—	—	11,250
Phoenix, AZ	165,297	—	—	—	14,301	—	133,226	2,689	15,081	—	—	—	—	—	—	—
Pierre, SD	197,528	12,586	—	—	—	—	165,500	—	—	5,339	—	2,625	11,478	—	—	—
Portland, OR	394,222	—	—	—	39,660	—	276,200	18,000	36,584	—	15,991	7,787	—	—	—	—
Reno, NV	158,436	—	—	—	—	—	150,168	—	—	—	—	—	—	—	—	8,268
Sacramento, CA	514,889	—	—	—	—	—	122,419	—	4,449	72,149	11,544	34,299	208,775	35,319	—	25,935
Salt Lake City, UT	201,620	—	—	—	18,711	17	146,727	—	—	706	1,399	16,563	—	—	—	17,497
San Diego, CA	407,801	—	—	—	—	—	231,061	—	3,805	12,889	28,085	17,828	108,579	—	—	5,554
San Francisco, CA	1,087,898	—	188,868	—	91,476	—	352,680	—	—	—	—	260,000	116,874	68,500	—	9,500
San Jose, CA	469,338	—	—	2,500	53,286	—	187,662	—	—	—	97,889	—	128,001	—	—	—
Santa Barbara, CA	326,190	—	—	—	—	—	176,785	—	—	10,633	11,230	44,877	72,665	—	—	10,000
Seattle, WA	2,263,198	—	—	—	21,431	126,665	1,093,254	341,700	12,964	153,365	43,292	44,669	9,534	135,031	17,267	264,026
Spokane, WA	317,262	—	—	—	47,481	—	173,716	—	4,255	35,640	15,541	11,169	—	—	—	29,460
Tucson, AZ	156,099	—	—	—	—	—	134,369	678	2,201	—	933	12,935	1,012	3,202	—	769
Tulsa, OK	924,942	389,692	—	—	36,904	97,800	332,894	—	—	—	5,987	27,061	—	—	—	34,604
Wichita, KS	375,586	—	—	—	—	—	241,956	—	1,772	19,601	15,193	11,837	39,978	—	—	45,249

Revenue Sources: CHC = Federal Community Health Center; MCH = Federal Maternal and Child Health; Title X = Federal Family Planning; WIC = Federal Women, Infants, and Children; Title V = IHS Urban Indian Funding.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Division of Health Systems Development, *Urban Indian Health Project Evaluation Report, Fiscal Year 1984* (Tucson, AZ: IHS, June 1985), table 1.

Table 5-20.—IHS-Funded Urban Indian Health Programs, Fiscal Year 1984: Distribution of Costs in Dollars by Program Component

Program	Total	Medical	Lab and X-ray	Pharmacy (medical)	Dental	Health education	Nutrition	Mental health	Optometry	Substance abuse	Other	Community service	Administration	Facility related
All programs	$16,567,293	$3,724,830	$451,940	$342,139	$2,167,395	$796,372	$602,145	$591,009	$216,675	$1,181,623	$628,232	$1,293,840	$3,548,400	$1,022,693
Percent of costs	100.00%	22.48%	2.73%	2.07%	13.08%	4.81%	3.63%	3.57%	1.31%	7.13%	3.79%	7.81%	21.42%	6.17%
Albuquerque, NM	110,058	30,830	—	—	—	5,827	10,020	1,768	—	200	1,500	—	58,906	1,007
Anaconda, MT	26,971	—	—	—	—	—	—	—	—	—	1,658	1,450	21,253	2,610
Bakersfield, CA	129,976	21,976	—	—	—	—	—	—	—	—	2,318	40,335	51,071	14,276
Billings, MT	77,012	16,800	1,184	7,057	—	—	—	—	—	—	—	15,633	29,498	6,840
Boston, MA	364,902	12,030	—	—	—	7,020	—	32,720	—	—	135,505	29,481	148,146	—
Butte, MT	38,323	2,401	4,123	217	1,370	348	—	—	1,656	—	796	229	24,288	2,895
Chicago, IL	153,834	21,524	734	—	25,168	4,109	—	—	—	—	—	22,670	73,408	6,221
Compton, CA	1,539,410	380,421	4,971	1,500	239,401	85,443	76,331	75,270	—	433,183	—	66,564	151,045	25,281
Dallas, TX	778,495	87,836	11,142	18,965	104,847	84,572	1,160	—	—	—	—	195,081	182,847	92,045
Denver, CO	211,794	14,703	910	310	9,078	—	—	—	10,406	—	13,689	64,332	71,807	26,559
Detroit, MI	179,349	20,932	—	—	3,867	—	840	—	—	37,466	—	38,238	53,052	24,954
Fresno, CA	494,556	120,702	—	—	70,832	30,372	66,268	—	—	—	24,652	61,309	105,765	14,656
Great Falls, MT	101,494	42,852	6,175	3,641	—	3,500	2,604	—	—	—	2,273	9,681	26,876	3,892
Green Bay, WI	167,364	—	—	—	—	—	—	—	—	33,078	—	60,036	59,923	14,327
Helena, MT	118,937	45,328	6,084	—	709	5,273	6,996	3,955	1,823	—	4,462	9,025	20,282	15,000
Miles City, MT	41,129	—	—	—	—	—	—	—	—	—	—	31,416	7,553	2,160
Milwaukee, WI	2,042,724	343,334	80,518	119,215	175,792	94,287	186,039	28,473	—	—	338,248	48,023	448,030	180,765
Minneapolis, MN	1,345,261	262,902	68,503	1,214	258,789	130,976	—	180,003	—	—	—	115,625	222,866	104,383
Missoula, MT	67,737	11,807	1,312	1,995	2,583	1,678	654	—	806	875	—	749	41,271	4,007
New York, NY	418,000	24,300	—	2,200	—	—	—	—	—	150,000	17,000	103,900	18,600	102,000
Oklahoma City, OK ...	454,541	122,417	22,929	23,103	90,096	2,522	—	—	—	—	—	18,023	118,069	57,382
Phoenix, AZ	165,297	111,637	—	—	—	—	14,301	—	—	—	—	—	39,359	—
Pierre, SD	238,527	104,806	23,574	5,000	—	—	—	—	12,294	11,478	—	8,749	50,419	22,207
Portland, OR	378,600	139,275	23,825	21,000	—	—	23,500	47,000	—	—	—	16,000	63,000	45,000
Reno, NV	150,168	42,094	5,149	3,300	—	4,931	—	—	—	—	19,422	28,129	42,349	4,794
Sacramento, CA	347,576	85,034	3,324	12,953	69,503	—	—	—	—	—	—	24,437	124,236	28,089
Salt Lake City, UT ...	136,029	27,568	—	—	12,196	—	16,325	—	5,214	—	4,800	—	66,326	3,600
San Diego, CA	355,355	124,374	—	—	124,554	—	—	—	—	—	—	35,782	70,645	—
San Francisco, CA ...	1,081,898	497,742	36,000	18,000	202,980	9,000	91,476	10,000	—	—	—	70,700	137,000	9,000
San Jose, CA	187,742	61,637	2,700	—	8,035	3,008	—	—	8,004	—	3,536	15,619	58,905	26,298
Santa Barbara, CA ...	302,250	—	—	—	199,188	—	—	—	450	—	—	42,252	60,360	—
Seattle, WA	2,488,050	476,844	88,410	45,303	317,779	100,216	48,431	198,202	176,022	515,343	17,267	57,998	446,235	—
Spokane, WA	466,101	119,508	27,342	35,885	87,351	—	23,250	5,000	—	—	25,705	—	97,857	44,203
Tucson, AZ	231,413	129,765	2,866	—	—	—	—	—	—	—	14,501	12,901	50,298	21,082
Tulsa, OK	801,166	156,522	24,155	8,818	89,935	223,290	—	—	—	—	—	30,752	169,988	97,706
Wichita, KS	375,254	64,929	6,010	12,463	73,342	—	33,950	8,618	—	—	900	18,721	136,867	19,454

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Division of Health Systems Development, *Urban Indian Health Project Evaluation Report, Fiscal Year 1984* (Tucson, AZ: IHS, June 1985), table 2.

Services Provided by Urban Indian Health Projects

In the summer of 1985, OTA conducted a short mail survey of the existing urban Indian health projects to supplement information available from two evaluations performed by IHS. These evaluations, covering fiscal years 1983 and 1984, were designed to assess the progress of urban Indian health projects from their inception in 1972 to their current status as a program authorized by the Indian Health Care Improvement Act.

The OTA Survey found that most of the urban projects or "human service organizations" funded by IHS offer a wide range of social services that are organized to alleviate individual or family problems or to fulfill basic human needs (48). Thirty-two percent of the patient encounters reported by the urban programs in fiscal year 1984 were medical; 10 percent were dental; 27 percent were health-related (health education, nutrition, mental health, optometry, and substance abuse programs); and 31 percent represented other community service contacts (184).

Table 5-22 outlines 10 broad categories of nonmedical, nondental services provided by the urban programs. The health education category includes activities such as health fairs, diabetic control sessions, prenatal classes for mothers, a healthy babies perinatal project, instruction in first aid, management of chronic medical problems, and literature on disease and trauma prevention. The jobs and training category includes employment and training services, economic assistance to Indian businesses, classes for the illiterate, a Job Training Partnership Act program, an Indian leadership program, and training programs for employees. The nutrition category, which is funded mostly from non-IHS sources, encompasses the Women, Infants and Children program (one of the major services provided to non-Indian clients), Federal food commodity distribution, and several emergency food banks. Outreach includes home health care similar to the community health representatives program, referral, transportation, and liaison with governmental agencies and the public.

Table 5-21.—Distribution of the American Indian, Eskimo, and Aleut Population Among SMSAs, 1980

Numbers of American Indians, Eskimos, and Aleuts in SMSAs	Numbers of SMSAs	Percent of total
> 9,000	20	6.3%
4,500 to 8,999	15	4.7
3,000 to 4,499	16	5.0
1,000 to 2,999	63	19.8
< 1,000	204	64.2
Total population	318	100.0%

SOURCE: U.S. Department of Commerce, Bureau of the Census, *1980 Census of Population: Characteristics of the Population, General Population Characteristics, U.S. Summary* (Washington, DC: U.S. Department of Commerce, December 1983), PC80-1-B1, table 69.

The social services category, which includes a broad range of services, is similar to what some tribal health departments provide to complement the medical care delivered directly by IHS. Examples of the social services provided by some urban programs include: paralegal counseling and advocacy; housing counseling, including food and lodging for the homeless; limited financial assistance, ranging from prescriptions and partial payment of emergency health care to fuel bill assistance; offender/ex-offender rehabilitation; a patient representative program; a senior center; a recreation center; and clothing. In some cases, these social services are part of mental health activities staffed with professional counselors offering help to all age groups.

The urban Indian health programs serve Indians and non-Indians. IHS regulations do not prohibit the programs from serving non-Indians, and other sources of Federal funds often require urban Indian centers to serve certain populations that include non-Indians. Hence, the only requirement that IHS imposes is that the number of Indians served by each program be proportional to the amount of money provided by IHS.

In fiscal year 1984, close to 60 percent of the users of the urban programs were Indian. In half of the programs, Indians represented 90 percent or more of the clientele; and four of these programs served Indians only (184). Verification of eligibility for IHS-funded urban Indian activities consists primarily of presentation of a certificate of degree of Indian blood issued by a tribe or BIA, a tribal membership card, or certifying affidavits signed by three eligible Indians (138).

Most of the urban Indian programs could not survive on IHS funding alone and would be inefficient if they served only Indians. Because they

Table 5-22.—Nonmedical, Nondental Services Offered by IHS-Supported Urban Indian Health Programs: Fiscal Year 1984

	Small programs (N = 10)		Medium programs (N = 10)		Large programs (N = 7)		Total (N = 27)
Type of service	Number	Percent[a]	Number	Percent[a]	Number	Percent[a]	Number
Health education	9	36%	14	56%	2	8%	25
Family planning	1	25	1	25	2	50	4
Jobs and training	3	50	0	0	3	50	6
Nutrition	5	21	8	33	11	46	24
Formal outreach	12	55	8	36	2	9	22
Social services	22	48	14	30	10	22	46
Alcohol and drug	1	17	2	33	3	50	6
Counseling	3	38	2	25	3	37	8
Children and youth	2	33	3	50	1	17	6
Family support	3	25	4	33	5	42	12

[a] Percentages shown are percent of row totals. The number of services may exceed the sample size since some programs offered more than one unique service within a given category.

SOURCE: U.S. Congress, Office of Technology Assessment, "Survey of Urban Indian Health Programs," 1985.

were established to provide medical and social services to a group of clients who are largely eligible for public health care, a few of the programs have competed successfully for a place within their local health delivery and social services network. For example, the Urban Indian Health Board, Inc., in the San Francisco Bay Area contracts with Alameda County to provide care to medically indigent non-Indian adults in its Oakland clinic. In June 1985, the State of Minnesota decided to serve its Medicaid population through health maintenance organizations. The Indian Health Board of Minneapolis, an urban Indian clinic that served 945 Medicaid-eligible clients in 1984, became qualified as part of the health maintenance organization delivery network (113).

Conclusions

Urban Indian health programs are important because of the demographic changes that have taken place in the Indian population. In the 1980 U.S. census, 50 percent of the 1.4 million persons who identified themselves as Indians lived in metropolitan areas. Approximately 829,000, or 59 percent, of the 1.4 million Indians were included in IHS's estimated service population living on or near a federally recognized reservation. Thus, about 10 percent of Indians identified in the 1980 census were living on or near reservations that were in or contiguous to metropolitan areas. However, IHS-supported programs for urban Indians have always been viewed and treated as separate from IHS's reservation-based service system.

Health care services are provided to Indians based on political relationships between the United States and tribal governments. When services are extended to Indians on the basis of race, as might be the view of urban program services since tribal governments are not involved in them, one of the basic premises of the trust relationship is undermined. An essential feature of IHS services for Indians is that individual recipients of care are affiliated with political entities, Indian tribes, that have established claims to such care. When Indians leave their reservations and the jurisdiction of their tribes, they lose whatever degree of tribal affiliation is associated with residence on an Indian reservation. One group, the National Tribal Chairmen's Association, once viewed as the major opponent of programs for urban Indians, has held that urban Indians relinquish their right to health care from IHS by leaving tribal jurisdiction. In congressional hearings of March 1985 (93), the executive director of the National Tribal Chairmen's Association retracted the organization's opposition to IHS funding for urban Indian health projects. Members of the National Tribal Chairmen's Association still feel, however, that non-tribal organizations, such as the nonprofit corporations that operate urban Indian programs, should coordinate the services they provide for Indians with tribal governments and elected Indian officials. But coordination of services between urban Indian health projects and area tribes is a formidable task. In some urban centers, there are as many as 40 tribal governments nearby, and representation by tribes on governing boards might include over 80 different tribes (4).

Urban Indian health programs, lacking tribal government legitimacy, may always be subject to opposition from tribal groups. The disagreement between some tribal leaders and proponents of the urban programs is as much over having to share funding as over points of law. Leaders of several urban Indian organizations feel strongly that the Federal Government is responsible for providing health care and social services to Indians regardless of their chosen residence (4,57). The fact that urban Indian health projects have been funded since 1976 by appropriations under the Indian Health Care Improvement Act, and have been operating under continuing resolution appropriations in fiscal years 1985 and 1986 in the absence of reauthorization of that act, indicates that their future is uncertain. The Administration's IHS budget proposals in recent years and for fiscal year 1987 have eliminated funding for urban Indian health projects. The negative effects of the Federal budget deficit on overall IHS funding suggest that priority is likely to be given to maintaining reservation-based direct and contract care delivery programs, rather than to maintaining or expanding urban Indian programs.

THE IHS HEALTH FACILITIES CONSTRUCTION PROGRAM

The IHS health facilities program provides funds for the construction of hospitals, health centers, health stations, sanitation facilities, and personnel quarters for eligible staff at these facilities. Since 1970, the program has built 14 hospitals, 20 health centers, and about 700 units of personnel quarters. The program also provides funds for the major modernization and repair of existing facilities. In 1960, a program to provide sanitation facilities and systems for Indian homes and communities began. This responsibility is shared by IHS with the Department of Housing and Urban Development (HUD) and BIA through its housing improvement program.

Funding for the IHS facilities construction program is appropriated by Congress separately from the IHS health services delivery budget. In fiscal year 1985, $61.6 million was appropriated for facilities construction, compared with $807 million for services delivery and program management (see app. C). Appropriations for facilities construction by type, 1956 through 1985, are summarized in table 5-23.

As of October 1984, within IHS's direct and tribally operated system, there were 51 Indian hospitals; 124 health centers; 285 smaller health stations, Alaska village clinics, and school health centers; 489 treatment locations (not fixed facilities); and 1 extended care facility (191). With the completion of sanitation facilities provided by the 1984 appropriations, over 144,000 American Indian and Alaska Native homes will have received water supply and/or sewage disposal systems (177). It is estimated, however, that about 22,000 existing homes have not yet received first service and that the unmet need for sanitation facilities is approximately $520 million (60). The IHS facilities construction program, its operation, and planning methodologies are described below.

Priority System for the Construction of Health Facilities

IHS has developed a priority system for the construction of clinical facilities (167). A committee that may include members from PHS, HRSA, IHS headquarters, and IHS area offices applies this priority system. The first priority list under this system was compiled in 1980; application of the system is described below and illustrated in figure 5-10

Application of the priority system results in three groups: Group A consists of those projects previously proposed to Congress for which funds were not appropriated (these projects are placed at the top of the priority list); Group B includes the top 10 new inpatient and ambulatory care projects respectively (5 each); and all other projects comprise Group C.

Phase I of the priority ranking system divides Groups B and C by assigning numerical values to workloads at the facility, demand for health care in the area, ability of the current facility to

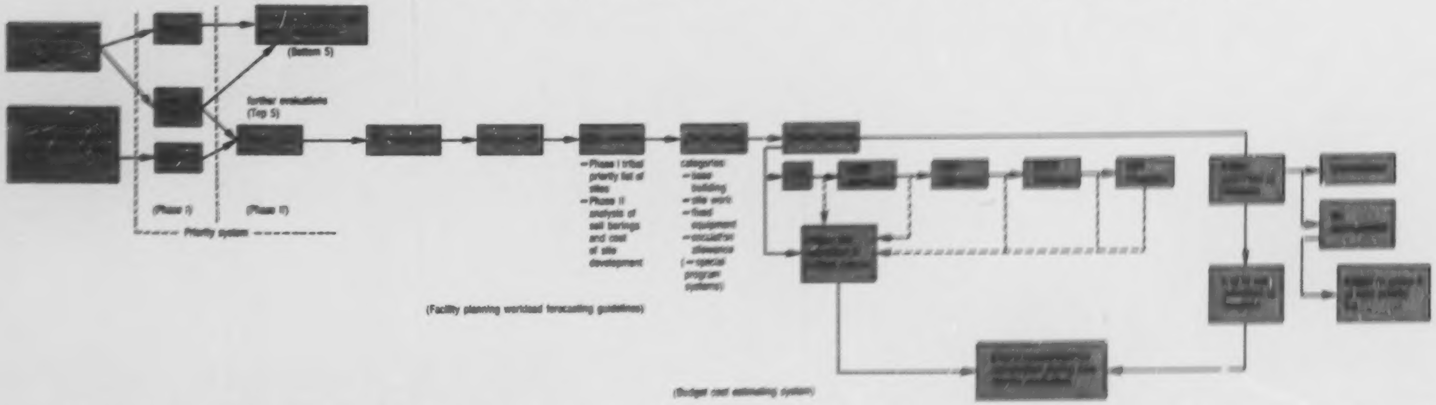
Table 5-23.—Indian Health Facilities, History of Appropriations by Activity, Fiscal Years 1956-85

Fiscal year	Hospitals: New and replacement	Hospitals: Modernization and repair	Hospitals: Total hospitals	Outpatient care facilities	Grants to community facilities	Sanitation facilities	Personnel quarters	Total
1985	$ 19,843,000	$ 2,086,000	$ 21,929,000	$ 9,712,000	$ -0-	$ 24,500,000	$ 5,493,000	$ 61,634,000
1984	28,965,000	200,000	29,165,000	960,000	-0-	21,000,000	2,470,000	53,595,000
1983	6,700,000	3,944,000	10,644,000	-0-	-0-	49,056,000	14,000,000	73,700,000
1982	28,965,000	200,000	9,723,000	9,613,000	-0-	38,680,000	336,000	58,352,000
1981	25,693,000	3,300,000	28,993,000	670,000	-0-	52,740,000	650,000	83,053,000[a]
1980	8,000,000	1,600,000	9,600,000	7,595,000	-0-	50,240,000	6,867,000	74,302,000
1979	20,181,000	3,139,000	23,320,000	-0-	-0-	50,640,000	3,000,000	76,960,000
1978	41,610,000	2,150,000	43,760,000	4,770,000	-0-	21,840,000	887,000	71,257,000
1977	33,400,000	50,000	33,450,000	2,520,000	625,000	125,848,000	720,000	163,163,000
1976-T.Q.[b]	-0-	-0-	-0-	-0-	-0-	11,084,000	-0-	11,084,000
1976	12,940,000	-0-	12,940,000	1,000,000	1,250,000	38,544,000	1,872,000	55,616,000
1975	10,035,000	-0-	10,035,000	1,375,000	-0-	40,521,000	5,500,000	57,431,000
1974	12,488,000	630,000	13,118,000	100,000	530,000	36,179,000	-0-	49,927,000
1973	7,305,000	1,355,000	8,660,000	44,000	100,000	35,745,000	-0-	44,549,000
1972	873,000	220,000	1,093,000	119,000	280,000	28,950,000	-0-	30,442,000
1971	220,000	45,000	265,000	-0-	-0-	18,450,000	-0-	18,715,000
1970	-0-	157,000	157,000	1,763,000	1,952,000	16,905,000	175,000	20,952,000
1969	-0-	549,000	549,000	46,000	864,000	16,657,000	40,000	18,156,000
1968	1,763,000	697,000	2,460,000	1,752,000	250,000	10,464,000	1,922,000	16,848,000
1967	1,115,800	2,411,700	3,527,500	1,425,500	-0-	5,736,000	3,800,000	14,489,000
1966	6,387,200	147,200	6,534,000	696,000	-0-	6,258,000	607,600	14,096,000
1965	1,799,700	979,000	2,779,600	362,400	-0-	4,550,000	1,143,000	8,835,000
1964	-0-	726,700	726,700	216,300	-0-	4,687,000	470,000	6,100,000
1963	2,913,000	1,275,600	4,189,000	620,700	100,000	4,000,000	425,000	9,335,000
1962	420,000	1,270,000	1,690,000	770,000	325,000	3,000,000	2,500,000	8,285,000
1961	1,238,500	1,025,300	2,263,800	400,200	500,000	2,550,000	4,000,000	9,714,000
1960	1,808,000	279,000	2,087,000	-0-	-0-	200,000	2,500,000	4,787,000
1959	1,886,000	1,545,400	3,431,400	114,600	1,750,000	-0-	714,000	6,010,000
1958	-0-	3,130,000	3,130,000	-0-	-0-	-0-	-0-	3,130,000
1957	6,762,000	1,000,000	7,762,000	-0-	-0-	-0-	1,000,000	8,762,000
1956	1,950,000	780,000	2,730,000	740,000	-0-	-0-	2,065,000	5,535,000[c]
Total	$265,827,900	$34,884,000	$300,712,700	$47,384,700	$8,526,000	$719,034,000	$63,156,600	$1,138,814,000

[a] Includes a recision of $3,916,000.
[b] Third-quarter adjustment for change in Federal fiscal year.
[c] Includes $535,500 unobligated balance transferred from BIA.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Planning, Evaluation, and Legislation, 1985.

Figure 5-10.—IHS Facilities Construction Process From Assessment of Need to Congressional Appropriation


(Bottom 5)
further evaluations
(Top 5)
(Phase I)
(Phase II)
Priority system
—Phase I tribal priority list of sites
—Phase II analysis of soil borings and cost of site development
categories
—base building
—site work
—fixed equipment
—escalation allowance
(—special program systems)
(Facility planning workload forecasting guidelines)
(Budget cost estimating system)

SOURCE: Adapted by the Office of Technology Assessment from information provided by U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Planning Branch, 1985.

meet demand, accessibility of alternative sources of care, and facilities evaluations conducted within the past 3 years by DHHS regional offices. Phase II verifies Group B scores and further ranks the projects on each list. The final priority construction list, then, is headed by Group A projects and followed by the top five Group B projects for each type of facility (inpatient and ambulatory care).

After a project has been approved by the priority system committee for inclusion on the priority list, the proposed facility then undergoes a more complete evaluation and a program information document (PID) is developed. The PID, which defines the scope of the project, is prepared by IHS headquarters or the area office in conjunction with the affected tribes. It contains information about existing health care delivery patterns and conditions, availability and accessibility of alternate resources, existing and projected workloads, populations to be served, existing program deficiencies, staffing conditions and requirements, alternative construction sites and the condition of those sites, and the amount and type of contract health care. The PID is used to define the size and location of the proposed facility and its equipment (78). Staffing requirements for a proposed facility are determined by IHS's resource requirement methodology, based on the projected size of the service population and projected workloads (60).

In 1984, PID development became more standardized with introduction of the "Facility Planning Forecasting Guidelines" (190). This document is essentially a procedures manual that contains the relevant information outlined above and instructions for calculating the workload rates and projections.

The methods used in projecting workloads assume that future utilization patterns will reflect current utilization, adjusted to the size of the estimated future service population. For example, a 3-year base period actual utilization rate is used to correct for aberrations in any single year, and adjustments are made to compensate for unmet need in the base utilization rate. Such adjustments are made only if documentation, such as lists of deferred cases, can be provided.

There are differences of opinion concerning both current population figures and assumed rates of growth. IHS derives its population figures from U.S. Census Bureau data, but there are concerns about the accuracy of these numbers in many Indian areas. IHS projections are adjusted to the local level for Indian births and deaths but do not take into account migration, i.e., Indians moving out of or into the service area. Until recently, IHS used the population figure for the middle year of the 3-year base period (a statistically acceptable method) to calculate a facility's utilization rate. At the request of PHS, however, the last year of the 3-year period now is used. This yields a lower utilization rate than would result if the mid-year population were used, assuming growth in population and utilization.

Workloads are projected 8 years into the future, which represents the estimated length of time from PID development to completion of a newly constructed facility. Workload projections are based on an analysis of the following current workloads: 1) the direct workload of the subject IHS facility generated by people residing within and outside the subject service area; 2) direct workload at nearby IHS facilities generated by people residing within the subject service area; and 3) a portion of contract care cases generated by people residing within the service area that could be handled in the new facility based on planned services (190). If data on contract health cases are inadequate and a detailed analysis cannot be performed, it is assumed that no more than 25 percent of the contract care workload will be provided in the new facility. This is a recent revision in IHS planning standards. Prior to publication of the forecasting guidelines, a default value of 50 percent of contract care was used.

The completed PID is submitted to PHS through HRSA. Unanimous approval of the PID by IHS, HRSA, PHS, and DHHS is the next essential step toward actual construction. As of late 1985, the guidelines for facilities planning described above had been adopted only by IHS, not by HRSA, PHS, or DHHS. Most PIDs developed since IHS adopted the guidelines in 1984 have not yet been thoroughly reviewed by HRSA, PHS, or DHHS because of a backlog of projects, and therefore these agencies have not had an opportunity to assess how well the process works. HRSA, PHS, and DHHS are not required to apply a particular methodology in making their facilities construction decisions.

Methods for Assessing Need for New and Replacement Facilities

Bed Size and Surgical Services

Prior to the mid-1970s, IHS based its decisions regarding the size of new or replacement hospitals on one of four hospital bed planning methodologies. In 1977, however, in response to a report by GAO, Congress imposed a moratorium on IHS's hospital construction until its acute care bed need methodology was revised (131).

IHS began using its revised system, the "Methodology for Determining Future IHS Acute Care Hospital Bed Needs," in 1980. Inpatient services are divided into general acute care and obstetrics. The average daily patient load over the 3 most recent years forms the base period workload rate. This figure is adjusted for eligible individuals who received care elsewhere because of limitations in the services available from their existing IHS facilities, and for documented cases where care was provided at the patient's own expense. This adjustment reflects the assumption that an adequately staffed replacement hospital would be expected to provide directly some of the care being referred out to other hospitals. The expected utilization rates are applied to a population estimate projected 8 years into the future from the base year. Projected average daily patient loads are adjusted to cover daily census fluctuations by estimating the number of beds that would be needed if the number of general acute care patients exceeded bed capacity no more than 10 percent of the time, and if obstetrical patients exceeded bed capacity no more than 5 percent of the time.

The results of these calculations are compared with those of two other standards: 1) general health planning guidelines recommending 3.7 beds per 1,000 population; and 2) an average facility occupancy rate of 80 percent, which represents reasonably efficient operation in short-stay hospitals (although nationally, hospital occupancy has averaged around 75 percent in recent years). If both of these methods generate a need for fewer beds than the forecasting guidelines calculation, the larger of these two alternatives is selected as the final estimate of needed hospital beds. Otherwise, the calculated value is used as the final estimate.

In estimating future needs for surgical services, the most recent 3-year surgical caseload is averaged and projected 8 years into the future, adjusted for simple population growth. Under IHS criteria for establishing an inpatient surgical service, a workload of 1,200 to 1,300 surgical cases per year is accepted as firm evidence of need for a surgical service. The minimum workload necessary for consideration of a surgical service is 600 to 900 cases per year. These rates were derived from IHS's resource requirement methodology, which requires need for a minimum of three surgeons to establish a surgical service. The 1,200 case level reflects 400 cases per surgeon per year, and the 600 to 900 figure reflects 200 to 300 cases per surgeon. (OTA applied these planning criteria to a particular facility construction case at the request of the U.S. Congress, Senate and House Appropriations Committees. The results of that analysis may be found in the OTA Staff Memo, "Replacing the Rosebud Sioux Hospital," August 1985 (140).)

Staff Quarters

In addition to establishing the size of the facility and its scope of services, the PID development and approval process provides the basis for determining the number of personnel quarters needed to house facility staff. Although IHS attempts to coordinate funding requests for staff quarters with the facility construction schedule, such requests frequently have been disallowed or omitted from final budget plans at higher levels in DHHS. As a result, construction of personnel quarters may not begin until after completion of the facility, leaving new facility staff without adequate or acceptable housing. When staff cannot be housed, expected levels of services cannot be provided (78).

Staff quarters are provided for new facilities and for facilities where there is a housing shortage or where the units are substandard. The number of units for newly constructed facilities is estimated from PID information on optimal staffing requirements for the proposed facility. In addition, the *Public Health Service Quarters Management Handbook* aids in determining need for staff quarters by setting down the rules governing which staff qualify for quarters. The housing need determination is further adjusted by local housing availability, whether this local housing meets HUD standards, and the experiences of other IHS facilities regarding the numbers of eligible employees who live on or off the reservation. The determination of the need for personnel quarters for existing IHS facilities is similar to that described above, except that it is based on current authorized staffing instead of projected staffing.

The House Committee on Appropriations requested that a priority system for the funding and construction of personnel quarters be in place by September 1985. At the end of 1985, IHS was developing such a priority system (62,78).

Medical Equipment

The PID summarizes relevant information concerning the equipment needs of the new facility. Funds for equipment generally are provided in the facility construction appropriation, but the equipment list is subject to additional approval. Each area office submits a list to IHS headquarters for verification and approval. Replacement equipment for an existing facility is considered in the maintenance and repair budget and undergoes a separate approval process, described later.

Site Selection

Selection and approval of the construction site takes place while the PID is under development. Site selection occurs in two phases. In phase I, the tribe, by tribal resolution, provides several sites for the proposed new construction. Each of the sites is evaluated by IHS as to size, terrain, availability of utilities and access, and ease of construction. After the surveys of proposed construction sites have been completed, the sites are ranked in order of preference. If the planned facility is approved, an in-depth analysis of the first choice construction site is done, including soil borings and the estimates of costs of site development (78).

When site selection is approved, the project cost is estimated. This was the responsibility of DHHS's Office of Facilities Engineering until 1982, when a new cost estimating system was adopted and IHS began to prepare estimates on a case-by-case basis; but either IHS or the Office of Facilities Engineering may prepare cost estimates for proposed projects. This budgeting system relies on: 1) modifying hospital or health center gross square foot values for changes in costs over time and location; 2) addition of special program costs to the base budget; and 3) monitoring costs through the design and construction phases to keep them within the established budget. Hospital and health center costs are categorized into five major components (78):

1. *Inflation allowance:* the estimated building cost is inflated to the expected mid-point in the construction schedule.
2. *Base building:* a gross square foot value that includes structural, architectural, electrical, and mechanical systems costs (solar and materials handling systems are excluded).
3. *Site work:* the site work value is obtained by using the gross square foot value or, when site information is available, by pricing major site work items based on anticipated quantities.
4. *Fixed equipment:* gross square foot values for fixed equipment are used.
5. *Special program systems:* solar systems, materials handling, and lawn sprinkler systems must be estimated and added if they are part of the proposed facility.

Project cost estimates are reviewed by IHS, HRSA, and PHS to arrive at the estimate that will be included in the budget request to Congress. There have been and continue to be differences in the cost estimates supported by the three levels of DHHS, in particular relative to the use of phased funding and to PHS's allowances for certain types of equipment, which IHS views as insufficient. IHS must, however, comply with PHS policies in these matters (78).

Finally, IHS prepares a budget proposal that must be approved by HRSA, PHS, DHHS, and the Office of Management and Budget (OMB). If a project is not included in the IHS facility program's budget request or if it is not submitted to Congress, the project can be submitted for reevaluation during the next application of the priority system. However, if a project is proposed for congressional appropriation and is not funded, it is placed automatically in Group B of the facility construction priority list. If funds are appropriated for a project by Congress, DHHS apportions the funds to IHS and steps toward actual construction begin.

Facility construction projects on the priority list are funded in phases by direct congressional line appropriations. Congress usually appropriates funds for design and planning in 1 fiscal year, phase I construction the following year, and then phase II construction including equipment costs to complete the facility. Funds for each subsequent phase generally are not appropriated until the preceding phase has been completed or is nearing completion. Consequently, in any particular set of annual appropriations, it may appear that the priority list system is not being followed, when in fact it is.

Facility Maintenance, Modernization, and Repairs

Funds for the maintenance and repair of IHS facilities, modernization projects (including the backlog of essential maintenance and repair projects, known as BEMAR), and energy conservation retrofit projects are specified in separate lines of the IHS health facilities appropriation.

Maintenance and Repair

Although these services are not within the purview of the facilities program proper, a brief description is provided. Each area office is allocated a specific amount for maintenance and repair based on an IHS-modified version of what is called the "University of Oklahoma methodology." Approximately 60 percent of these funds are spent for day-to-day maintenance items, e.g., in-house maintenance and repair projects and contractual services (boilers, elevators, generators, etc.). The remaining 40 percent are used for special maintenance and repair and BEMAR projects, the priority of which is the responsibility of each area office. Those special projects not funded within the maintenance and repair projects budget can be requested by the area office as a special maintenance and repair project under BEMAR (funding for which is discussed below). The funds also may be used to replace or upgrade equipment, e.g., boilers, heating and air-conditioning equipment, and air handlers in IHS facilities. The 1985 allocation for maintenance and repair projects was $8.6 million and the 1986 budget was expected to increase to around $8.7 million.

Additional funding for certain maintenance and repair projects can be provided from Medicare and Medicaid collections, which are generated by billing those programs for services provided to their Indian beneficiaries in IHS facilities. Such collections must be used to correct deficiencies cited by JCAH and to meet Medicare conditions of participation, e.g., staffing levels (by hiring temporary personnel) and life-safety code deficiencies. Each facility prepares an annual plan for correction of deficiencies and submits it to IHS headquarters. The plans are approved and/or modified and returned to the area office. As a matter of policy, which would have been mandated by the vetoed 1984 amendments to the Indian Health Care Improvement Act, the Medicare and Medicaid reimbursements collected in an IHS area should be available for use in that area. The area office has discretion in further distributing funds to the facilities in its jurisdiction, based on an approved annual plan. In fiscal year 1984, nearly $27 million was collected from all IHS areas. At one point, there was an estimated unobligated balance of $10 million in Medicare and Medicaid collections from 1984. According to IHS headquarters, such balances result from the fact that collection cycles may require up to 2 years to complete, from billing the intermediary, to receiving the funds at IHS and making final decisions regarding their distribution (122).

Modernization and Repair

The health facilities program is responsible for the modernization and repair of the facilities it builds. This includes providing construction funds for current projects and those on the BEMAR list, as well as funds needed for energy conservation retrofit projects.

As of June 1984, there was an estimated backlog of $98 million in IHS modernization and repair projects (174). This included $65 million for

BEMAR projects. The other projects resulted from deficiencies in such areas as fire, life, and safety codes; environmental quality; requirements to provide access for handicapped individuals; and energy management and installed equipment (e.g., boilers). Backlog project information derives from area office totals of the annual facilities deficiency survey. The survey supports an automated data system, updated annually, which maintains an inventory and condition evaluation of IHS property, estimated facility repair costs, and life expectancies of all real and installed equipment. Every fifth year, data are collected for the "deep look" facility deficiency survey. Approval of BEMAR projects is based on this information.

Area offices are responsible for ranking their BEMAR projects in order of priority, and a priority list combining all 12 area lists is assembled at IHS headquarters. This list is based on a scoring system that assigns points for deficiencies involving life-support systems, life-safety regulations, facility accreditation, and emergency repairs. IHS may or may not further revise its priority list depending on the total BEMAR budget. For example, IHS's initial BEMAR budget request for 1985 amounted to $20 million; PHS reduced this request to $8 million, a cut that required IHS to develop a new priority list. The budget was cut again to $2.1 million to accommodate the OMB allowance, leaving funds for only six new projects. The projects that ultimately were funded were chosen from IHS priority lists in keeping with a policy decision to favor inpatient facilities. Similarly, the five projects to be funded in fiscal year 1986 from a budget of $2.45 million were selected because of a subjective, though informed, decision to favor emergency repairs (27).

In order to better ensure the equitable allocation of funds and to reduce the number of projects on the current BEMAR list, IHS has formed a repair and improvement project prioritization committee comprised of representatives from each area office. The objective of this committee is to eliminate the estimated $98 million backlog (BEMAR) in 5 years beginning in 1987.

According to congressional mandate in the Energy Policy and Conservation Act of 1975 (Public Law 94-163), as modified by Presidential order*, by 1985 all existing Federal facilities must reduce their energy usage by 20 percent from the base period, October 1974 to September 1975. All new Federal facilities must use 45 percent less energy than existing facilities did during the base period. In 1982, IHS was appropriated $192,000 to conduct energy conservation retrofit studies. As a result of these studies, IHS compiled a list of 27 projects complete with project descriptions and estimated costs. IHS's preliminary budget request for fiscal year 1986 included these projects estimated to cost $4.6 million. To date, however, none of the projects has been included in the OMB allowance.

Sanitation Facilities

The Indian Sanitation Facilities Act of 1959 (Public Law 86-121) provided for the supply of water and waste disposal facilities to American Indian homes, lands, and communities. Environmental health funds for IHS are split between the IHS sanitation budget (in the preventive health services allocation) and the IHS facilities construction appropriation.

Funding in the preventive health services allocation is primarily service-oriented, providing personnel, such as sanitarians, environmental health technicians, injury control specialists, sanitary engineers, and engineering technicians who provide the technical services necessary to construct and maintain sanitation facilities. The IHS environmental health program funded 428 staff positions in fiscal year 1985, when the allocation was $20.2 million.

The IHS facilities construction program, on the other hand, funds the construction of sanitation facilities. For the first 15 years of the sanitation facilities program, the main thrust was to serve existing homes; but congressional appropriations changed the bias toward providing facilities for new homes, usually sponsored by either HUD, BIA's housing improvement program, or by individual tribes. The relationship between the three Federal agencies—IHS, HUD, and BIA—was established in a 1976 agreement. In 1982, this agreement was modified at the suggestion of OMB so that HUD-sponsored Indian housing projects would receive HUD funds for sanitation facilities. In 1986, for example, IHS anticipates that approximately $24 million in funding authority will be required from HUD to provide sanitation facilities for the 2,500 HUD-sponsored housing units expected to be allocated.

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*Executive Order 12003, Energy Policy and Conservation, FR Doc 77-21414, July 20, 1977.

In general, BIA's housing improvement projects receive first IHS funding priority. In fiscal year 1986, IHS's preliminary budget request provided for $8 million for the construction of facilities for 1,000 BIA project homes. The remaining funds would be allocated to other new Indian housing projects on the basis of greatest need and "first come, first serve." IHS, in its fiscal year 1986 preliminary budget request, anticipated the need for an additional $15 million to fund sanitation facility construction for 1,900 tribally sponsored housing projects.

The need for sanitation facility construction for existing homes has been estimated at $520 million for over 22,000 existing homes that have never received first service sanitation facilities (60). This information is based on the sanitation facilities' unmet needs data system, which collects data annually. For fiscal year 1986, IHS requested $29 million to provide services for 3,800 existing homes. The DHHS allowance for 1986 provided construction funds for 300 BIA project homes (at $2.3 million) and 350 tribally sponsored homes (at $2.7 million). Funds for existing homes were not provided.

Conclusions

The IHS facilities construction program has been active since 1970 in building 14 hospitals, 20 health centers, and 700 units of staff quarters. It also has completed facility modernizations and repairs, as well as sanitation projects in cooperation with HUD and BIA. Since 1980, a relatively detailed system for setting priorities among facility construction proposals has been applied to develop the annual priority lists that are submitted to Congress for appropriations.

IHS facility planning guidelines specify criteria and standards to determine facility size and range of services. It should be noted, however, that planning for individual facilities does not represent health system planning based on an assessment of health problems, service needs, and utilization patterns throughout IHS area or overall service populations. The service delivery and facilities construction components of IHS, funded through two separate appropriations, have never been closely integrated. For this reason, questions have been raised as to whether IHS facilities have been located where they can serve the largest numbers of eligible Indians in the most cost-effective way. Tribes have been very active in promoting their own facility construction projects, because they have found that new facilities bring with them increased staffing and other resources (staffing that is considerably more generous than levels assigned to existing facilities), and thus are an effective means of securing funding increases beyond what would be expected under the IHS program continuity budget approach.

The Administration has called for elimination of the IHS facilities construction program, including the sanitation facilities component, in its budget proposals for fiscal years 1985, 1986, and 1987. In spite of this clear Administration direction, Congress has continued to fund some projects such as the replacement hospitals at Rosebud, South Dakota, and Kanakanak, Alaska. But whether Congress will continue to find IHS facility construction requests compelling, in view of the severely constrained budget climate, cannot be predicted.

If IHS's mission is to raise Indian health to the highest possible level, given present budget constraints, any funds that Congress may appropriate for facilities construction and maintenance would be better spent if facilities planning were coordinated with planning to meet present and projected health service needs. The loss of NHSC physicians and the potential for serious medical staffing shortages in the 1990s also indicate a need to reevaluate IHS facility construction plans.

Needs-based services planning might result in a rethinking of the IHS facilities construction program. For example, resources might be directed toward construction and renovation of ambulatory care facilities, rather than hospitals, in areas where inpatient care could be purchased at reasonable prices from private providers. Or, rather than commit large amounts of money to new facility construction, lesser amounts might fund substantial improvements in existing facilities by completing needed renovations and repairs, providing staff quarters where required, and purchasing essential medical equipment. With limited prospects of budget growth for the immediate future and a likely shortage of physicians, IHS might choose to support and maintain its existing network of facilities rather than undertake new construction. Finally, because there is general agreement among public health professionals that safe water and adequate sanitation are essential to maintaining health, IHS could request funds to continue its sanitation projects, which will not be undertaken by any other Federal, State, or local agency, instead of constructing new hospitals and clinics.

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Selected Issues In Indian Health Care

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Chapter 6

Selected Issues In Indian Health Care

INTRODUCTION

This chapter presents more detailed discussions of several issues that have been raised earlier in this report on Indian health care. The issues were selected because of their evident importance to Indian groups in all parts of the country, as expressed in discussions at the Office of Technology Assessment (OTA) regional meetings, and because of their interest to congressional committees in view of possible legislative action. The issues that have been selected for special analysis are: Indian Health Service (IHS) implementation of the Indian Self-Determination and Education Assistance Act of 1975 (Public Law 93-638); methods of resource allocation in IHS; the effects of high-cost cases in the IHS contract care program; and problems of data management in IHS.

From the time of its initiation 10 years ago, the IHS self-determination program (or 638 contract program, as it is known) has had a dual purpose —both to deliver health services under the administration of Indian tribal governments, and to strengthen the tribal governments themselves. the disagreements that have arisen between IHS and the Indian tribes during the program's implementation. The issues most often raised revolve around the adequacy of funding for tribally operated IHS programs, IHS contract administration policies (which vary somewhat among IHS areas), and striking a reasonable balance between IHS control and tribal flexibility in program implementation.

Although there have been many frustrations for the tribes and for IHS, there have been no proposals to abandon the self-determination program. Enthusiasm for self-determination has varied among the tribes, but 20 to 30 percent of the IHS clinical services budget now is administered by tribes under 638 contracts. The adequacy of IHS funding for self-determination health programs is the major concern. In view of current and expected future constraints on all Federal spending, including appropriations for IHS, the funding issue is likely to remain critical. Tribes may decide not to undertake 638 contracts due to reasonable fears of the financial risks involved. Because Congress may consider amending the Self-Determination Act, this assessment reports views on the program gathered from discussions with IHS headquarters, IHS area office staff, and Indian tribal governments and health program administrators around the country. The IHS self-determination program also was identified for special study by the General Accounting Office (GAO), which is due to issue its report in 1986.

IHS's methods of allocating funds among its 12 service areas are a subject of general complaint: whether an area receives a large or small share of IHS resources, it is likely to be dissatisfied. IHS allocates its annual appropriations by a "historical" or "program continuity" budgeting approach, which means that existing facilities and services are supported at their previous year's level plus a share of budget increases. Contrary to the understanding of many tribes, the resource requirement methodology that figures in IHS's equity fund distribution does not play a role in overall budget allocations. To date, the IHS allocation process has not incorporated factors such as population size, health status and health service needs, relative geographic isolation, or the availability of other IHS or non-IHS services. It is not likely that IHS now could generate the data necessary to take all of these factors into account.

The results of IHS's program continuity budget approach can be documented in the unplanned, uneven distribution of funding (on a per capita basis), facilities and services, and staffing throughout the system. While some IHS areas are relatively well-served by IHS direct and contract care programs, other areas lack certain types of direct care services and are forced by inadequate funding to ration contract care referrals. Areas lacking IHS direct services are not compensated with additional contract care funding. IHS's own method of identifying tribes with the greatest resource deficiencies, in order to distribute a court-ordered equity fund, provides ample evidence that eligible Indians in different parts of the country do not have equal access to IHS services. The equity fund distributions since 1981, which have been applied to less than 2 percent of IHS appropriations each year, have had little impact on IHS area base budgets. Although work has been underway recently to develop a resource allocation formula similar to the equity approach that reflects relative resource needs, the extent to which such a formula will be applied will be a political and administrative decision. IHS, which to date has been unable to apply a systematic approach to the cost-effective and equitable distribution of program increases, may in the near future be faced with the more difficult task of distributing budget reductions.

The congressional request for this assessment specifically asked for an analysis of the effects of high-cost cases on the IHS contract care program. For several years, there has been consensus among tribes, IHS, and Congress that the provision of contract care, which is intended to supplement services available from the IHS direct care system, is being seriously disrupted by the very high costs of a few emergency cases. Because of limited funding, IHS contract care programs operate under various rationing techniques, including eligibility requirements more restrictive than for direct care, a medical priority system that authorizes care for emergency and life-threatening conditions at the expense of less urgent services, and the required first use of non-IHS alternate providers and payers. The need to ration contract care services indicates that contract care funding is not adequate to meet expressed demand. It is not surprising, then, that a few high-cost cases can have severe negative effects on already constrained budgets. Some IHS areas have established area-level high-cost case contingency funds to help service units manage their contract care programs.

When Congress addressed the problem of IHS high-cost cases in the 1984 Indian Health Improvement Act (vetoed in October 1984), it found that available information did not indicate whether the proposed $12 million catastrophic health emergency fund would be adequate to relieve the situation. For this reason, OTA made particular efforts to develop information on the subject; however, the inability to obtain reliable, consistent data remained an obstacle to the analysis. Existing IHS data systems did not provide needed data items (e.g., complete costs of services in direct and contract care programs); and a special IHS data collection effort was informal and incomplete. Data on the causes of high-cost cases were not adequate to determine if IHS experiences an unusually high incidence of such conditions. The IHS population at risk for high-cost cases could not be defined with sufficient detail to merit consideration of options such as private reinsurance.

It was concluded, therefore, that the problem could be addressed as a budget management problem. The proposed revolving fund would be a reasonable way to provide temporary budget relief, although it would not benefit all IHS areas equally unless the threshold were adjusted to reflect relative costs among the areas. Work with available IHS cost data suggested that the $12 million contingency fund would have been adequate to cover high-cost cases in 1983, but given medical cost inflation, it probably would not be adequate now.

The last issue in this chapter deals with the quality and availability of usable patient care and program management data in the IHS system. OTA did not attempt to perform a management evaluation of IHS in general or of its data systems in particular. In working with a wide range of IHS offices and staff over the course of the assessment, however, some general observations about data systems became apparent. First, IHS operates a large number of uncoordinated data systems that are not uniform among IHS areas, and which, therefore, cannot be easily aggregated to provide national program data. The systems depend on a mix of automated and manual support systems, which add to the problems of incompatibility. Second, data from most 638 contract programs have not been included in IHS data systems. Thus, many tables in this report include footnotes indicating the absence of data from 638 contractors. Although IHS issued a memorandum late in 1985 to require minimum data reporting from 638 programs, the effects of this policy change are not yet apparent. Third, cost data are particularly difficult to obtain from existing IHS data systems. There are systems that monitor IHS disbursements for contract care, but these costs cannot be compared with costs of delivering the same services in IHS direct care facilities, so decisions about whether a service would be provided more cost-effectively by IHS or under contract cannot be made.

In many aspects of IHS operations, the inadequacy of program management information is apparent. For several years, IHS has been planning a new, comprehensive Resource and Patient Management System that may or may not resolve some of these data problems; but it will require national program leadership, funding, and time for this new system to become a reality.

SELF-DETERMINATION AND TRIBAL ASSUMPTION OF HEALTH SERVICES MANAGEMENT

Introduction

The Indian Self-Determination and Education Assistance Act of 1975 (Public Law 93-638) offered Indian tribes the opportunity to assume management of programs operated for their benefit by the Bureau of Indian Affairs (BIA) in the U.S. Department of the Interior and by IHS in the U.S. Department of Health and Human Services (DHHS).

The Self-Determination Act (also known as the 638 law) has been implemented separately by BIA and IHS according to their own policies and regulations. IHS, BIA, and Indian tribes now have had 10 years' experience with self-determination. In IHS, self-determination is primarily a contract program, with decentralized administration through the 12 IHS area offices. There is no self-determination program office at IHS headquarters, although there is an office that coordinates liaison between IHS and tribal self-determination contractors. Officially, IHS has taken a neutral stance in encouraging or discouraging tribes from entering into self-determination contracts. The IHS position is that tribes exercise their rights under self-determination either by deciding or declining to assume management of health service programs (42 CFR Subpart I, 36.201-36.202).

The responses of Indian tribes and tribal organizations to the opportunities of self-determination or 638 contracting have varied. While some Indian groups have worked enthusiastically to take over management of major components of their health care systems, other groups have been reluctant to participate, perhaps because they are satisfied to let IHS manage their services or because they fear self-determination will lead to termination of the Federal responsibility for Indian health. Differences in the numbers and types of 638 contracts managed by tribes in the 12 IHS areas, described later in this section, illustrate the variability of tribal responses. Given this lack of unanimous support for 638 contracting among Indian tribes, IHS has preferred not to become a strong advocate of self-determination.

Self-determination has been the subject of considerable interest during its 10-year history. It was a major topic of discussion at the four regional meetings conducted by OTA to obtain tribal input to this study. Many tribal representatives expressed immediate concerns and frustrations with the 638 contract application process and with IHS monitoring of contracts. In spite of these difficulties, however, there was no apparent desire to eliminate the program; on the contrary, there were many suggestions on how self-determination could be made more attractive to tribes. GAO is completing a study of the IHS 638 contract process, based on detailed case studies in several IHS areas, which should be available in spring 1986. Congress may address some of the problems associated with self-determination contracting in future amendments to the law.

This section presents OTA's findings on the IHS self-determination program based on interviews, comments, and materials obtained during the regional meetings and related visits with tribes, tribal 638 contractors, and IHS headquarters and area staff. Following a background discussion of IHS implementation activities and a survey of tribal contracts by IHS area, the discussion will focus on issues related to self-determination contracts with IHS.

IHS' policies and regulations for implementing its self-determination program are an issue in themselves. The law specifies that self-determination contracts should be administered differently from Federal procurement contracts, because a 638 contract represents a transfer of funds and management responsibility, not a purchase of services from an outside provider. Rather than the usual arm's-length relationship between the Government and the contractor, self-determination requires IHS to work with prospective tribal contractors in developing their applications and to provide technical assistance as necessary. Self-determination contracting requires unique policies and modified contract regulations, which may explain some of the difficulties experienced both by tribal contractors and by IHS area staff. Also, because of IHS's decentralized administration of the program, variations have developed in how different IHS area offices implement and monitor 638 contracts.

Complaints about particular problems with 638 contract development and administration, which may be unavoidable to some extent, reflect larger issues of project control between IHS and tribal contractors. IHS contends that 638 contracted activities are extensions of IHS itself, and therefore IHS should retain responsibility and control. Tribes argue that they are assuming both responsibilities and financial risks and therefore should be allowed more flexibility in managing 638 activities.

IHS and Indian tribes agree that the major obstacle to increased self-determination contracting is inadequate funding. The Self-Determination Act states that a tribal contractor should receive funding equivalent to what IHS itself spent on providing the services in question. IHS's estimate of this amount (referred to as the "Secretarial level of funding"), however, does not always satisfy tribal contractors, who argue that they have legitimate operating costs that are not included in the IHS estimate. "Indirect costs" is the term most often heard in this debate, and malpractice insurance costs are the most frequently cited example.

When the Self-Determination Act became law in 1975, it was anticipated that tribes would be able to operate service programs more efficiently than IHS, and therefore be able to expand services or to cover additional operating costs such as liability insurance. Some of the first 638 contracts received additional indirect or administrative overhead costs, and IHS sometimes has provided additional support when funding was available; but in recent years, there have been no IHS appropriations for the indirect costs associated with 638 contracts. Many tribal contractors believe that the total contract award, which IHS contends covers both direct and administrative costs (IHS's total cost of service delivery), is inadequate and, in effect, forces the contractor to reduce services in order to cover essential administrative costs.

Another issue concerns IHS area office staff as tribal contractors assume responsibility for more IHS services. When a tribe contracts to operate an IHS facility or service unit, it may simply transfer most of the IHS staff to tribal employment. Some tribal contractors believe, however, that as their own management capabilities grow, IHS area office staff should be reduced and part of the savings in personnel costs earmarked for 638 contract administrative expenses and additional services. IHS responds that area office staff must be maintained because developing and monitoring 638 contracts require as much or more effort than was needed when IHS delivered services directly. Another reason cited by IHS is that tribes may turn back their self-determination contracts to IHS with 120 days' notice (retrocession), and IHS must be prepared to resume program management. The future of the IHS self-determination program will depend to a large extent on how these issues are resolved.

IHS Implementation of the Self-Determination Program and the Response of Indian Tribes

IHS Program Implementation

The Self-Determination Act and the regulations that govern its implementation in IHS state that grants or contracts may be awarded to tribes and tribal organizations "to carry out any or all of the functions, authorities, and responsibilities of the Secretary of Health and Human Services under the Act of August 5, 1954" (the Transfer Act, as amended) (42 CFR Subpart I 36.201). The use of cooperative agreements, which are similar to grants, was authorized in 1984 by an amendment to the law; but no cooperative agreements had been used in IHS as of the end of 1985.

IHS programs implemented pursuant to the 1976 Indian Health Care Improvement Act, such as the Indian health manpower scholarship programs and urban Indian health projects, are not subject to self-determination contracting because they were not among the functions conveyed to DHHS by the Transfer Act. Furthermore, it is the IHS position that the administration and support responsibilities of IHS headquarters and area offices usually are not contractible, because such functions are difficult to associate with specific tribes (60).

Although IHS regulations provide that tribes may administer the same types of health programs either by grant or by contract, the grant component of the IHS self-determination program has never been very large. Grants may be awarded to tribes to administer health services, subject to annual renewal. One-year grants are also available to develop tribal management capabilities such as personnel and accounting systems, for feasibility studies to help tribes determine whether or not they should contract a service, and for tribal health planning activities (42 CFR 36 Subpart G). IHS 638 grants have not exceeded 10 percent of annual combined tribal health contract (including Buy Indian contracts) and grant expenditures (see table 6-1 and figure 6-1). In fiscal year 1984, grants for the self-determination program represented only $16.5 million, or 8.5 percent, of the total $194 million obligation.

Contracts have been the predominant means of transferring IHS health programs to tribal management. In some IHS areas, such as Nashville and California, tribal organizations contracted to deliver health services well before the Self-Determination Act became law. Some contracts that predated self-determination, such as those executed under the Buy Indian Act of 1910, have since been converted to 638 contracts. Most tribes seem to prefer contracts to grants, possibly because they are familiar with the long-standing Buy Indian contract program. In addition, grants may be perceived as reflecting the relationship of a superior entity, in this case the Federal Government through IHS, to a lesser one, the Indian tribe; whereas a contractual relationship is often seen as an agreement between equally responsible parties and more appropriate to a government-to-government transaction (87).

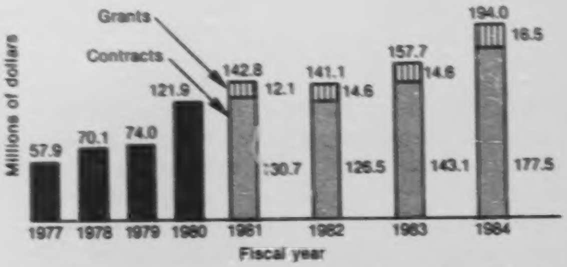
Table 6-1.—IHS Tribal Health Contract and Grant Obligations, Fiscal Years 1975-84[a]
(millions of dollars)

Fiscal year	Total	Contracts	Grants
1984	$194.0	$177.5	$16.5
1983	157.7	143.1	14.6
1982	141.1	126.5	14.6
1981	142.8	130.7	12.1
1980	121.9		
1979	74.0		
1978	70.1		
1977	57.9		
1976	32.6		
1975	17.4		

[a] Report complete as of Feb. 1, 1985. Contracts include both 638 and Buy Indian contracts. Grant obligations are shown separately for the first time in 1981.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, April 1985, published as table 5.2. From TRAIS Contracts Data Base, Management Systems Development Branch, IHS.

Figure 6-1.—IHS Tribal Health Contract and Grant Obligations, Fiscal Years 1977-84[a]



[a] Report complete as of Feb. 1, 1985. Contracts include both 638 and Buy Indian contracts. Grant obligations are shown separately for the first time in 1981.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, April 1985, published as figure 5.2, from TRAIS Contracts Data Base, Management Systems Development Branch.

As noted earlier, the intent of the Self-Determination Act is for IHS to facilitate 638 contracting. The law directs the Federal Government to assist tribal governments in developing necessary management capabilities; to provide technical assistance to tribes in preparing contract proposals; and to enter into all contracts that are proposed unless specific conditions for denial can be documented (e.g., that services would not be provided in a satisfactory manner, or that trust resources would not be adequately protected) (42 U.S.C. 2001). A tribal 638 contractor with cause may return a project to IHS management with 120 days' notice. IHS, on the other hand, may not rescind a 638 contract without first working with the tribe to correct deficiencies and allowing for tribal appeals, except where there is an immediate threat to life or safety (42 CFR 36.231-36.234).

Table 6-1 shows that tribal health contract and grant activities increased from $17.4 million in fiscal year 1975 to $142.8 million in 1981 and $194 million in 1984 (tables 6-1 and 6-2 combine obligations for IHS self-determination and Buy Indian contracts). In fiscal year 1984, total IHS obligations to tribes for 638 contracts, Buy Indian contracts, and 638 grants ($194 million) amounted to 30 percent of the IHS clinical services budget of $645.5 million. As shown in table 6-2 and figure 6-2, the primary use of 638 and Buy Indian contract funds in fiscal year 1984 was health services delivery ($111.4 million, or about 63 percent of total contract obligations of $177.5 million).

Table 6-2.—IHS Tribal Health Contract and Grant Obligations by Tribal Activity, Fiscal Year 1984[a]

Tribal activity	
Contract and grant total	$193,953,186
Contracts total	177,479,579
Health department management	5,472,660
Health services delivery	111,352,779
Training	2,984,009
Other contracts	40,895,626[b]
Indirect costs	16,774,505[c]
Grants	
Projects	16,455,589[d]

[a] Report complete as of Feb. 1, 1985. Contractsinclude both 638 and Buy Indian contracts.

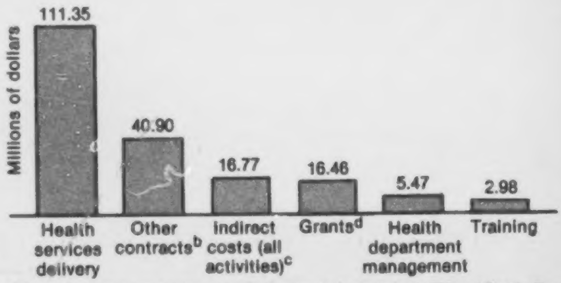
[b] Other contracts includes $36,538,512 that has been reported but not assigned to a specific tribal activity as defined in this table.

[c] Indirect costs are shown separately and are not included in each tribal contract activity.

[d] The grants total includes scholarships, applied training and development, and study grants.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, April 1985, published as table 5.3, from TRAIS Contracts Data Base, Management Systems Development Branch, IHS, and PHS Grants Data System.

Figure 6-2.—IHS Tribal Health Contract and Grant Obligations by Tribal Activity, Fiscal Year 1984[a]



[a] Report complete as of Feb. 1, 1985. Contracts include both 638 and Buy Indian contracts.

[b] Other contracts includes $36,538,512 which has been reported but not assigned to a specific tribal activity as defined in this figure.

[c] Indirect costs are shown separately and are not included in each tribal contract activity.

[d] The grants total includes scholarships, applied training and development, and study grants.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, *Chart Series Book*, April 1985, published as figure 5-3, from TRAIS Contracts Data Base, Management Systems Development Branch, IHS and PHS Grants Data System.

Indirect costs amounted to 9.5 percent of total contract awards.

Table 6-3 presents data for self-determination contracts only, by IHS area, obtained from IHS by special request. These data indicate that 638 contracts represented about 85 percent ($152.4 million) of the $177.5 million in 1984 IHS contract obligations, while Buy Indian contracts represented 15 percent (215).

The data in table 6-3 also suggest that in fiscal year 1985, Indian tribes administered more than $141 million under 638 contracts. The 1985 IHS clinical services budget (excluding funds for IHS headquarters operations in Rockville and data processing in Albuquerque) was $637 million. Of this amount, $164 million (26 percent) was spent on IHS contract care and $473 million (74 percent) was spent on IHS direct services. There are some inconsistencies among IHS areas in how 638 contract funds are accounted to direct care or contract care budget components. However, if the $141 million in 638 contracts (excluding Buy Indian contracts and 638 grants) was associated primarily with tribal management of direct care rather than contract care services, it would represent 30 percent of the direct care budget and 22

Table 6-3.—IHS 638 Contract Activity by Area, Number, and Dollar Amount of Contract Awards, Fiscal Years 1979-85[a]

	Fiscal year						
Areas	1979	1980	1981	1982	1983	1984	1985
Aberdeen	$ 1,897,575 1	$ 2,708,968 8	$ 6,680,295 35	$ 11,048,649 39	$ 12,153,028 72	$ 13,284,084 43	$ 13,038,422 40
Alaska	10,959,839 12	5,875,003 22	22,654,392 33	20,913,797 35	29,859,667 31	38,703,156 22	26,341,939 19
Albuquerque	1,083,818 8	2,292,582 16	2,562,057 21	1,919,462 14	2,715,689 20	2,763,060 21	2,252,020 20
Bemidji	988,501 12	9,452,364 51	11,729,119 87	17,557,043 97	19,353,373 96	21,729,906 86	17,310,251 52
Billings	— —	469,660 2	672,072 3	2,681,906 16	4,063,432 25	4,057,974 25	4,916,113 23
California	232,110 5	1,371,537 9	6,539,696 26	7,645,647 26	16,893,751 36	14,561,825 39	20,784,286 24
Nashville	2,949,131 16	6,306,963 15	14,659,016 23	12,753,153 15	14,840,895 20	20,235,864 19	20,212,334 16
Navajo	— —	— —	— —	30,995 1	65,168 1	101,771 1	280,148 1
Oklahoma	2,215,899 21	3,267,578 19	4,383,351 24	8,803,967 39	8,124,916 47	13,316,233 46	12,882,942 57
Phoenix	1,908,716 10	3,204,994 24	5,218,661 37	4,767,554 41	6,789,882 58	8,611,486 61	6,923,748 52
Portland	411,841 9	6,904,598 57	8,707,341 74	9,513,176 71	9,697,788 98	12,646,744 85	13,740,282 75
Tucson	967,517 10	1,762,163 11	1,937,122 11	1,619,297 13	1,794,369 6	2,402,507 9	2,394,639 5
IHS total	$23,614,947 104	$43,616,410 234	$85,743,122 374	$99,254,646 407	$126,351,958 510	$152,414,610 457	$141,077,124 384

[a] The numbers of contracts are total contracts active during the fiscal year, combined new and renewal contracts. Dollar amounts are total awards including funding modifications and indirect costs.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, TRAIS data system, as reported from Albuquerque Data Center to IHS Office of Tribal Activities, Division of Indian Resource Liaison, summary sheets received 11/12/85.

percent of the total $637 million IHS clinical services budget.

In spite of contract regulations and procedures that have been modified in favor of tribes, comments from tribal organizations and IHS staff around the country suggest that some tribes believe the risks and problems of self-determination contracts outweigh the advantages. Some of these problems are discussed later in this section.

Tribally Operated Health Programs

The numbers and types of health programs administered by the tribes under self-determination vary substantially among IHS areas. The numbers of 638 contracts by area, with dollar awards, have been summarized in table 6-3. (Detailed lists of 638 contracts active as of March 1985 have been tabulated from IHS sources and displayed by tribe, service unit, State, and IHS area office; these are available from OTA.)

Some of the more traditional reservation-based tribes in areas with well-established, comprehensive IHS direct care programs (especially, hospitals and clinics) have not been active in 638 contracting. The Navajo tribe is an example. This is the largest single tribe served by IHS, with an estimated IHS service population of 166,493 in 1985. Although the Navajo tribal government has considerable administrative expertise, 638 contracting plays virtually no role in health care delivery for the Navajo. The tribe manages only one IHS 638 contract for the community health nursing program. In the Albuquerque area, only 2 of 22 health clinics are tribally operated, and the other 638 contracts are for specific programs such as community health representatives, alcoholism, otitis media, speech and hearing problems, and mental health. This pattern applies in general to the Aberdeen, Billings, Phoenix, and Tucson IHS areas (with the exception of the Pascua-Yaqui prepaid plan in the Tucson area).

The Oklahoma City IHS area differs somewhat from IHS areas identified above, but it is closer to them than to other areas more active in 638 contracting. There is an extensive IHS direct care system in Oklahoma, and the entire State is designated a contract health services delivery area. There are seven Indian hospitals in the Oklahoma IHS area, five operated by IHS and two, the Creek Nation hospital at Okemah and the Oklahoma Choctaw hospital at Talihina (as of January 1985), operated under 638 contracts. Oklahoma area IHS hospitals are larger, newer, and offer a wider range of inpatient services (including surgery) than the typical IHS hospital. The health clinics in the Oklahoma City IHS area are predominantly IHS operated. Many of the Oklahoma tribes manage 638 contracts, but most are relatively small contracts for specific services.

In contrast to the IHS areas just mentioned, in which 638 contracting is relatively unimportant to the overall Indian health care system, are the IHS areas of Alaska, California, Bemidji, and Nashville. Each of these areas has a relatively recent and unique relationship with IHS.

The approximately 73,000 Alaska Natives are served by seven hospitals of varying sizes and capabilities, including the IHS medical center at Anchorage. The hospitals at Nome (Norton Sound), Dillingham or Kanakanak (Bristol Bay), and Mt. Edgecumbe (Southeast Alaska, as of January 1986) are tribally operated. In addition, the Alaska Native Health Corporations contract under 638 to operate substantial components of the IHS system. In fiscal year 1984, the native corporations managed about $39 million (38 percent) of the area's total clinical services budget of nearly $102 million (see table 6-3 and app. C). Two entire service units and a number of facilities (including 3 of 8 health centers and all 173 village clinics) are administered by Alaska Natives. Despite requirements of the 638 contract application process that pose particular problems in Alaska (discussed below), Alaska Native Health Corporations seem determined to take over management of their health service systems.

In the California, Bemidji, and Nashville IHS areas, many Indian groups live in small, scattered bands and rancherias. Tribes in these areas generally do not have reservations and may, at best, have limited tribal trust land bases. A relatively large number of these tribes have had their Federal recognition reinstated only recently. In these areas, tribally operated 638 programs are an important part of the IHS system.

The California area has no IHS direct care facilities (the Yuma IHS hospital is physically located in California, but it is administered by the Phoenix area office). IHS services are provided entirely through 638 contracts with the many California tribes, which are grouped into 20 projects equivalent to service units. The bulk of 638 funding in California goes to tribally operated clinics and health stations that deliver ambulatory health services.

The Bemidji area has two IHS direct care hospitals. Half of the area's health clinics are tribally operated, and nearly every tribe administers at least one 638 contract for a specific service such as community health representatives or substance abuse. Some tribes also administer comprehensive health delivery and sanitation 638 contracts.

IHS historically has not had a major presence in the Eastern United States. The Nashville program office was separated from the Oklahoma City area office in 1971 and now serves 16 small tribes dispersed throughout the eastern one-third of the country. Several of these tribes have regained Federal recognition since 1980. Because of limited IHS staff and the geographic dispersion of tribes in the Nashville area, most IHS services are delivered through comprehensive 638 contracts. The contracts range in scope from the tribally operated Choctaw hospital in Philadelphia, Mississippi, to limited health referral services.

The Portland IHS area is similar to the California, Bemidji, and Nashville areas in that it is characterized (with a few exceptions) by relatively small tribes with limited land bases. Several tribes in the Portland area have regained Federal recognition recently. There are no hospitals in the Portland area operated either by IHS or by tribes. Four of 16 health centers and 13 of 21 health stations in the Portland area are tribally operated. Unlike tribes in the California, Bemidji, and Nashville areas, Portland area tribes are less likely to administer comprehensive health service 638 contracts. Most of the 638 contracts are for specific health services such as community health nursing, community health representatives, and substance abuse. The two tribes that contract under 638 to administer their own contract care programs do so in compliance with Portland area office guidelines.

It is clear from reviewing 638 contract activities in the 12 IHS areas that responses to the self-determination program have varied among tribes around the country. Differences are apparent both in the amounts (number of contracts, dollar awards) and in the types of health services that are contracted by the tribes. Questions might be raised over how many of the 638 contracts represent actual takeovers of health program management and how many are essentially transfers of administrative responsibility. Some of the problems and issues involved in 638 contracting that may affect a tribe's decision to contract or not to contract are discussed below.

Issues Related to Contracting Under the Self-Determination Act

A central issue in this analysis concerns IHS's implementation of the Indian Self-Determination Act in relation to the intent of the law as passed by Congress. Congress sought to support tribal governments and to encourage more active participation by Indian tribes and tribal organizations in the delivery of IHS services. Although Congress and many American Indian groups view self-determination as an opportunity for Indian tribes to exercise greater influence over services provided to them, IHS appears to focus primarily on the contract administration aspects of the self-determination program. These different approaches may account for some of the difficulties that have arisen between IHS and Indian groups in carrying out the provisions of the self-determination legislation.

The following discussion deals with issues related to self-determination as implemented by IHS. The specific areas of discussion include IHS implementation policies and procedures at IHS headquarters and area office levels; the adequacy of funding for 638 contracts; and tribal experiences in administering 638 contracts.

IHS Policies and Procedures for Implementing 638 Contracts

In the view of some participants, IHS has not shown a clear commitment to achieving Indian self-determination. Perhaps the reason that IHS has not been aggressive in implementing the program is because some tribes continue to suspect that self-determination may be a means of reducing Federal responsibility for Indian health. IHS self-determination regulations include the following statement (42 CFR Subpart I 36.201 (a)(4)):

> It is the policy of the Secretary to continually encourage Indian tribes to become increasingly knowledgeable about Indian Health Service programs and the opportunities Indian tribes have regarding them; however, it is the policy of the Indian Health Service to leave to Indian tribes the initiative in making requests for contracts and to regard self-determination as including the decision of an Indian tribe not to request contracts.

IHS has been criticized by some Indian organizations for not moving as quickly as it might have to support tribal interests in 638 contracting. Uncertainties about IHS headquarters' policies and the delegation of administrative responsibility to the area offices have resulted in variations among IHS areas, both in 638 contract application procedures and in monitoring contracts awarded to the tribes.

The 638 Contract Application Process in IHS.—The Self-Determination Act directs IHS to provide technical assistance to tribes in developing 638 contract proposals and to approve all such proposals unless specific grounds for denial can be documented.

Resolutions of support for a 638 contract proposal must be obtained by the prospective contractor from all affected tribes (42 CFR Subpart I, 36.206). This requirement may not be a concern in areas where a health program serves only one tribe, but in areas such as Alaska, where many native villages are served under a single Alaska Native Health Corporation, obtaining resolutions of support from 100 percent of the villages can be an obstacle. In some instances, Alaska villages have bargained for other unrelated benefits by withholding their support for a 638 contract proposal (67). A similar situation exists in California, where Indian bands are affiliated with health consortiums that deliver services through 638 contracts. A tribe may change its affiliation apparently at any time, and such changes disrupt program administration and funding throughout the area (9).

Another significant problem in developing a 638 contract application, according to tribal organizations, is the reluctance or inability of IHS area offices to provide adequate cost data on existing IHS operations. Cost data are essential to the tribes in order to develop their financial management plans for a project; however, IHS does not maintain an internal cost-accounting system and so cannot provide data in the detail that would be expected by a private organization developing a management contract for a hospital or clinic. When IHS has not been able to identify the costs associated with a project to the satisfaction of the potential tribal contractor, disputes have resulted. As will be discussed in relation to 638 funding issues, a tribe is entitled to the same level of funding that IHS would have committed to provide the service directly.

IHS Monitoring of Self-Determination Contracts.—Once a tribe signs a 638 contract to manage a particular health service, IHS responsibilities for that service shift from direct delivery to program monitoring and contract administration. The staffing levels of IHS area offices have not declined as direct delivery functions have been transferred to the tribes because, according to IHS, 638 contracts require substantial monitoring. In addition, regulations provide that tribes may return a contract to IHS responsibility with 120 days' notice. Tribal contractors, on the other hand, argue that unnecessary personnel in IHS area offices absorb funds that should be made available for 638 contracts.

The suggestion that 638 contract administration creates special demands on IHS staff is plausible, given the differences between 638 contracting requirements and other Federal contracting requirements. In the case of Federal fixed-cost or cost-reimbursement contracts, an arm's length relationship between the Government and the contractor is required. The Government may order changes in contract scope unilaterally and may terminate the contract at its convenience, while the contractor may not. Federal labor laws and equal opportunity provisions also apply to the contractor. In the case of self-determination contracts, however, these requirements are modified: IHS is directed to assist tribes in developing 638 contracts; all changes in a 638 contract require the consent of the contractor; the Government may reassume management of a 638 contract only for specified reasons, but the contractor may turn back a 638 contract with 120 days' notice; employees of tribal 638 contractors are not subject to certain Federal labor laws; and Indian preference in employment and training supersedes equal opportunity rules. In addition, tribal 638 contractors enjoy exemption from bonding requirements (42 CFR Subpart I, 36.223) and may carry over unspent contract funds to the following year (42 CFR Subpart I, 36.236) (187).

IHS regulations for 638 grant and contract administration were published in November 1975 (42 CFR 36 Subparts H and I). Since 1981, IHS headquarters has provided additional guidance on specific points in the form of Indian self-determination memoranda. Nonetheless, variations among IHS areas appear to be common when it comes to the application of 638 contracting policies and procedures. IHS decisionmaking on 638 applications and contract management questions sometimes is viewed by tribal contractors as arbitrary and capricious; and tribes have complained that the appeals process is not adequate (68).

In some IHS areas, such as Nashville and California, many of the 638 contracts are written for ambulatory clinic management and comprehensive health service programs. In such cases, it may be desirable to allow tribal contractors as much flexibility as possible to operate their programs within the terms of their contracts. That is the explicit policy of the Nashville IHS area, where IHS staff also believe there should be routine contract audits for effective financial monitoring and accurate indirect cost determinations (84). In the Portland area, by contrast, individual 638 contracts are strictly defined and monitored by IHS area office personnel from their initiation. IHS staff in some area offices believe tribes occasionally seek to expand services beyond the scope of their 638 contracts. For example, contractors may incur unauthorized costs by hiring additional staff whose services may not be directly related to the contract (84).

Health Facilities Construction Under 638 Contracts.—IHS regulations implementing Public Law 93-638 permit tribal construction of health facilities under grants or contracts (42 CFR 36 Subparts H and I), but facilities construction has not been a major component of the 638 program. Perhaps five or six 638 construction grants were awarded for staff quarters and one clinic before 1982 (16), when the Public Health Service (PHS) decided to allow facilities construction by contract only. This was because construction under a grant might be interpreted as conferring facility ownership (60). The first clinic constructed under a 638 contract was built by the Menominee tribe, and between 5 and 10 IHS clinics now have been constructed by tribal contractors. The first hospital constructed under a 638 contract was at Red Lake, Minnesota. At the end of 1985, two hospitals were in the planning and construction stages as 638 projects: one in Kanakanak (Dillingham), Alaska, and one in Rosebud, South Dakota (16).

The limited amount of facilities construction that has been authorized under the self-determination program reflects the opposition of PHS and the Health Resources and Services Administration (HRSA), the agencies in which IHS operates, to any construction of new Indian health facilities. Concerns have been expressed in HRSA about inadequate monitoring of 638 facilities construction and about the difficulties that may arise if a tribal contractor does not adhere to contract terms regarding facility size and service capabilities (117). Finally, tribes may collect a contract management fee for overseeing 638 construction subcontractors, which is seen by Federal administrators as unearned profit.

The Cost-Reimbursement Contract in the 638 Process.—Much of the dissatisfaction that is voiced by tribal 638 contractors about IHS area office contract administration centers on the contract format itself and inconsistencies in the interpretation of Federal contracting regulations. Many tribes regard the voucher reimbursement system that IHS applies in 638 contract management as unnecessarily time-consuming, inflexible, and restrictive. The question then arises whether the cost-reimbursement contract is the most suitable means of transferring responsibility for services delivery from the Federal Government to Indian tribes.

Another type of instrument—the cooperative agreement—was introduced by the Federal Grants and Cooperative Agreement Act of 1977 (Public Law 95-224). Public Law 95-224 did not apply specifically to the Indian self-determination process, but a technical amendment to Public Law 93-638 in 1984 provided that cooperative agreements could be used, if mutually acceptable to IHS and the tribes. Tribes in some areas, particularly in the Southwest, are interested in cooperative agreements as a more flexible alternative to standard contracting. IHS and HRSA officials point out, however, that cooperative agreements are like grants in that they allow the Government (not the tribes) more discretion than is permitted in a contract to modify the products, timeframes, and funding levels of the project (87). It appears that the more discretionary cooperative agreements are a sensitive subject, because they may be viewed by some tribes as another step toward termination. A few years ago, BIA proposed to convert its 638 contracts to cooperative agreements, but so many tribes opposed the change that it was abandoned. Contracts, for all their difficulties, are preferred by many tribes because they are legally binding agreements between parties of relatively equal stature (in the case of 638 contracts, between the Federal Government and tribal governments). IHS has considered the use of cooperative agreements but has not as yet adopted a formal policy on the subject, and it is unlikely that any cooperative agreements will be used by IHS in fiscal year 1986 (87).

Another instrument that is authorized under separate legislation (Public Law 86-121), the memorandum of agreement, is unique to IHS environmental health and sanitation projects. Memoranda of agreement usually specify the terms of cooperation between IHS and a tribe or tribes in completing sanitation projects. IHS's general counsel has ruled that memoranda of agreement projects are exempt from the Federal Davis-Bacon union wage scale requirement, and this is an important consideration because tribes often cannot pay union scale.

The Adequacy of Funding for 638 Contracts

Currently, there are significant financial disincentives to 638 contracting: many tribes believe that funding levels set by IHS for 638 contracts are inadequate. Some tribes argue that the cost data on which IHS determines its contract awards may be inadequate or incorrect; and tribal contractors may not feel confident in judging the adequacy of a proposed 638 contract amount, because they cannot obtain sufficiently detailed and reliable cost accounting data from IHS. In addition, 638 contracts are for a fixed amount, and tribal contractors are responsible for actual costs in excess of that amount.

The larger and more comprehensive the health service activities managed by 638 contract, the greater the financial risks to tribal contractors. This situation may explain in part why relatively few comprehensive contracts have been negotiated and why the majority of tribes prefer to manage small, limited-service contracts. Specific service programs also may be more attractive to tribal contractors because they require less-specialized management expertise, frequently are add-ons to existing IHS services, and offer employment opportunities at relatively low financial risk to the tribe.

The financial risk factor is especially acute in tribally operated contract care programs, where unpredictably high-cost cases can make budgets difficult to control. The catastrophic health emergency fund proposed in recent legislation would include 638 contract care programs in its coverage. At present, however, tribes that manage their own contract health services under 638 contracts must follow area office regulations in order to qualify for the area's catastrophic care contingency fund, if available (as in Alaska, Portland, and the Oklahoma City IHS areas); make special provision for the catastrophic coverage part of the 638 contract; aggressively collect third-party payments to supplement IHS funding; or deny contract care authorizations for costly emergency services.

The most frequently voiced tribal complaint about funding has to do with administrative or indirect costs. This issue often is raised when the costs to a tribal 638 contractor of providing a particular health program exceed the costs attributed to that program by IHS. A number of factors are involved in this problem. Tribal 638 contractors may have legitimate costs that are not required of IHS at the area or service unit level. For example, central IHS support services (e.g., legal and accounting resources, budget development, procurement and contract administration, specialized technical assistance, data collection and processing, and facilities planning) are not likely to be charged to local service programs. Managers of 638 programs may have to purchase these needed services from the private sector at additional cost. IHS cannot authorize contractors to purchase facilities if no funds have been appropriated specifically for that purpose; hence contractors may be obliged to lease facility space at higher cost.

Medical malpractice insurance is frequently cited by the tribes and by IHS as a significant problem for 638 contractors. Medical professionals employed by the Federal Government are covered by the Federal Tort Claims Act; but programs operated by the tribes need separate malpractice insurance for their medical professionals, because Indian tribes have sovereign immunity against suit (60). Tribal contractors also have difficulty matching the fringe benefits available to Federal employees, such as life and health insurance and retirement plans, because of the cost of purchasing those benefits in the private sector.

Although Public Law 93-638 does not specify that tribal contractors should receive direct and indirect costs, IHS self-determination regulations do address the issue. The basic guideline regarding 638 contract funding levels is expressed as the "Secretarial level of funding" (25 U.S.C. 450j), and the IHS regulation states: "The tribal organization shall be entitled to be funded for direct and indirect costs at a level which is not less than would have been provided if the IHS had operated the program or portion thereof during the contract period" (42 CFR 36.235). Allowable indirect costs are defined in Federal contract general provisions, but different interpretations can result from variations in accounting systems and definitions.

No research has been done in IHS to identify the actual range of 638 contract indirect costs or to determine what would be reasonable. Although some of the earlier 638 contractors received indirect costs from IHS through additional appropriations (as is still the case for BIA 638 contracts), such funding has been reduced or eliminated. Tribes object to the inequities that have resulted from this change. As a result, tribal contractors believe they now are expected to cover indirect costs out of their direct service funds, thus reducing the level of services they can provide, which is contrary to the intent of the Self-Determination Act (134).

A recent example of a dispute involving indirect costs was the disagreement between IHS and the Southeast Alaska Regional Health Board over the board's proposal to manage the Mt. Edgecumbe hospital. The disagreement, which was the first case ever to reach the IHS declination appeals board (in April 1985), centered on the amount of the contract award. The board argued that as a 638 contractor, it should receive all IHS costs attributable to the hospital, including the share of Alaska area office functions (e.g., claims processing and accounting), that supported hospital operations. The native group sent an accountant to the IHS area office to review records and estimate administrative costs associated with the Mt. Edgecumbe hospital. When the area office stated it did not have adequate funds to cover the amount requested by the native group and it would not enter into a 638 contract, the board appealed that decision. Despite questions raised by the Alaska Natives about the declination appeals process itself, the appeal was denied (68). Following negotiations between IHS and the Southeast Alaska Regional Health Board over the course of 1985, an agreement was reached on the contract funding level and the Mt. Edgecumbe hospital and service unit were transferred to board control in January 1986 (33).

Tribal Administration of 638 Contracts

Tribes have widely different attitudes about 638 contracting. Many tribes in the Alaska, California, Bemidji, and Nashville IHS areas are enthusiastic about self-determination. In other areas, such as Aberdeen, fears of termination of the Federal responsibility for Indian health persist. Other tribes may recognize no compelling reasons to change, particularly in view of the financial risks of 638 contracting.

In addition to the financial difficulties of 638 contracting, administrative considerations may discourage tribal participation. Managing a health program or facility, especially in the first years of a 638 contract, may impose unexpected demands on tribal employees. In addition to responsibilities for developing and administering personnel functions and employee benefits plans, tribal government and contract staff are likely to find new Federal reporting requirements associated with the contract.

The responsibility for collecting third-party reimbursements transfers from IHS to tribal staff with a 638 contract. Depending on the efficiency of previous IHS collection systems and the nature of relations with the payers, this transition may be more or less difficult. Delays in collections quickly have an adverse effect on cash flow and, consequently, on a project's ability to deliver services.

The third-party reimbursement situation is further complicated in California, where 638 programs traditionally have served significant numbers of unaffiliated Indians and unknown numbers of non-Indians. California 638 contractors recently have undergone extensive audits to determine whether Federal funds have been expended on services for non-Indians (43). IHS's opinion is that a 638 contract is an extension of IHS itself, and this relationship requires a separation of funding and services to Indians and non-Indians, even in areas such as California where the distinctions are not always clear.

When a 638 contract includes operation of an IHS facility, tribal contractors may be justifiably concerned about the physical condition of the facility and the prospects for securing IHS funds for major renovations or facility replacement, if necessary. Because it was not clear whether tribally operated facilities would be eligible for renovation and replacement under the same priority system that applies to IHS direct care facilities, the Senate version of the 1985 Indian Health Care Improvement Act provided for inclusion of 638 contract facilities in the IHS facilities construction program.

One of the most difficult management problems confronting a 638 contractor is project staffing. Many IHS delivery sites are so isolated that staff recruitment and retention are difficult regardless of available funding, and the programs may depend on PHS Commissioned Corps and National Health Service Corps placements to fill medical positions. When such programs transfer to tribal control under 638 contracts, the tribes may choose to hire Federal employees already at the site. If this is not successful, however, tribal contractors may have difficulty recruiting private health professionals. Some tribes also may find it difficult to retain Federal or private employees due to an inability to match Federal salaries and fringe benefits, the uncertainties of tribal politics, or other reasons.

Tribal 638 contractors have several staffing options when they assume operation of an IHS health facility, service unit, or service program. At the time of the initial 638 transfer (and at that time only), tribal contractors may acquire IHS employees under special Intergovernmental Personnel Act (IPA) agreements. Under the conditions of these special IPAs, staff members remain Federal IHS employees, retain Federal benefits, and answer to both a Federal and a tribal supervisor. These IPAs have no time limit and can be extended indefinitely at the agreement of the tribe, the employee, and IHS. Special IPAs are the most frequently used means of staffing 638 contract programs. (For example, the transfer of 180 IHS employees from the Mt. Edgecumbe hospital and service unit to tribal control was accomplished with special IPAs.) After the initial 638 takeover, tribes may obtain the services of Federal employees under regular, 2-year time-limited IPAs (renewable for a total of 6 years). Tribes may terminate IPA employees at any time. In another option that effectively is the same as an IPA, PHS Commissioned Corps may be assigned to 638 contractors under memoranda of agreement (33).

A second important means of staffing 638 facilities and programs is by tribal direct hiring of former Federal employees. The employee must resign from his Federal position before being hired by the tribal contractor but may retain his Federal benefits if the tribe agrees. In most cases, direct-hire employees switch to tribal government benefit plans. (The 638 transfer of the IHS hospital at Talihina, Oklahoma, to the Oklahoma Choctaw tribe in January 1985 primarily involved the direct hire of former Federal staff.) Tribes may also direct hire non-Federal outside staff (33).

Tribal control of 638 project staff has its advantages. Federal employees may be retained selectively, and tribes may terminate IPA and direct-hire employees at any time. Tribes may hire new staff from the Indian community, thus providing needed jobs (this can be an important consideration for both economic and political reasons). Local Indians who are IHS employees, however, may not always be eager to transfer from Federal to tribal government control because of reduced job security and fringe benefits.

IHS regulations require that contracts awarded under the Self-Determination Act incorporate a clause requiring Indian preference in employment and training (42 CFR 36.221). This clause, however, is less restrictive than the Indian preference requirement for IHS employees, because it permits 638 contractors to hire non-Indians after giving full consideration to Indian applicants (42 CFR 36.41). Most tribes prefer not to be bound by Indian preference in employment and training.

Conclusions

Tribal governments and IHS both acknowledge frustrations with the self-determination program, but there have been no suggestions that it be abandoned. Some tribes think IHS should provide stronger leadership to achieve the goals of self-determination, together with clear policy guidance to the area offices in their application of contracting and procurement regulations to the special needs of 638 projects. Applying Federal regulations too strictly can create administrative and reporting problems for tribes as they attempt to manage their service delivery programs. Serious cash flow problems can result from the inevitable delays of the IHS voucher reimbursement system. Some tribes that now manage 638 contracts complain of inadequate technical assistance, lack of expertise, and inconsistent, uninformed decisionmaking at the area office level. IHS area staff, on the other hand, reply that they are required to spend a great deal of time educating tribal staff, who may change frequently, in the policies and procedures of 638 contract management. The in-depth study by GAO of IHS 638 contract administration, which will be reported in 1986, should provide current, detailed information for the objective evaluation of many of these issues.

The level of funding necessary to support tribal 638 health programs, discussed above, has been debated since the act became law. With IHS budgets now stable or undergoing reductions, funding for 638 contracts may become an increasingly serious problem. The most frequently debated complaint about IHS self-determination funding is that it does not adequately compensate tribes for necessary indirect or administrative costs.

Many of the specific points at issue between Indian tribes and IHS are tests of a question central to the self-determination program: Who is in control of a 638 project? Opinions naturally differ, depending on the viewer's perspective. IHS implementation of self-determination tends to focus on contract administration responsibilities, while tribes look to 638 contracts as a means to more effective self-government.

IHS regulations state clearly that the self-determination law is not intended to alter existing eligibility criteria for IHS services. IHS 638 contract projects are considered extensions of IHS itself. If 638 contract projects are extensions of IHS, then IHS is responsible for administering the contracts on behalf of its parent agency, HRSA, according to Federal contracting and procurement policies specially adapted for the program. Tribal contractors are monitored by IHS to ensure that they adhere to the terms of their contracts, an approach that limits the flexibility of 638 contractors to modify the scope of services they have agreed to deliver or to redefine their service populations. IHS monitors and processes 638 contract financial records through its area offices, which have the primary role in the procurement and accounting aspects of contract management under the overall supervision of the HRSA financial management office.

If 638 programs are extensions of IHS, it also follows that they should be included with direct care services in all IHS data systems. At the end of 1985, most 638 programs were not included in IHS data systems. Many tribal contractors, given the option of using IHS data collection forms and processing systems or their own noncompatible systems, chose to use their own systems. Some 638 contracts specifically included data reporting requirements compatible with IHS systems, but area office staff found they lacked effective means of enforcing the requirements. As a result, IHS clinical services data are incomplete, because 638 contract data are not captured for all programs.

IHS staff in the Nashville area have stated that despite special efforts over the period of a year or more, they were unable to get IHS headquarters to include records from their 638 contractors in the contract care "piggyback" data system (84). IHS headquarters staff ascribe that particular problem to incompatible codes in the automated data records obtained from the tribes. As more Indian health services are provided under 638 contracts, this loss of clinical and management data will become an increasingly serious problem unless, as announced in a memorandum from the IHS Acting Director in fall 1985, comparable data reporting is required as a condition of funding for 638 contracts (50).

One consequence of administering Public Law 93-638 as a contract program and 638 contracts as extensions of IHS has been the retention of IHS headquarters and area office staff at virtually unchanged levels. The fact that IHS staffing has not declined as tribal 638 management responsibilities have increased is an issue with some tribes who believe, rightly or wrongly, that IHS staff duplicate tribal contract managers at the expense of additional funding that could be devoted to patient care. Maintenance of IHS staffing levels may be justified to some extent, however, by the 638 program provision that allows a tribe to return or retrocede a contract with only 120 days' notice. IHS argues that staff must be retained in case of such retrocessions and because of the administrative functions associated with monitoring 638 contracts. The retrocession provision could be revised so that a longer notice would be required, allowing for a more orderly transition and necessary staffing adjustments.

Many tribal governments are interested in self-determination as a means of gaining greater control over their own health services. The purpose of the program as they see it is not contracting per se (which has been an option since 1910 under the Buy Indian Act), but self-determination. Because the law and regulations state that tribal 638 contractors are entitled to the level of funding committed by IHS to the contracted services, a view has developed that each tribe has the right to a certain portion of the area budget and should be able to spend it as it sees fit.

From the point of view of self-determination, the 638 contracting process could be made simpler and more flexible than it is at present. Tribes contend, with reason, that self-determination contracts are not supposed to be administered exactly as other Federal contracts. Contract negotiation and monitoring procedures have been modified, and could be modified further by IHS and HRSA through regulations and Indian self-determination memoranda, to make the procedures more suitable to implementation of "a meaningful Indian self-determination policy which will permit an orderly transition from Federal domination of programs for and services to Indians to effective and meaningful participation by the Indian people in the planning, conduct, and administration of those programs and services" (42 CFR 36.201 (2)).

If tribal governments are to assume responsibility for program management, the tribes argue, they should have adequate authority and flexibility to succeed. Because 638 contract funds are relatively limited and may not cover all program administrative costs, tribal contractors believe they need greater flexibility to manage the programs effectively. If the contractors had more flexibility in program financial management (and perhaps some limitation of financial risk), they might be more likely to take over comprehensive health delivery programs instead of following the pattern seen in many areas, the management of multiple, small, limited 638 contracts. For some 638 projects, financial survival may depend on aggressive third-party payer collections and the ability to serve and bill all local users. In such cases, the issue of serving non-Indians is not one of proper use of IHS funds, but of the right of tribes to provide services to whomever they choose to augment health program revenues.

A variety of conflicts has developed over the 10 years of IHS implementation of the Indian Self-Determination Act. Rather than attempting to resolve each specific complaint, it would seem more reasonable for Congress, the Administration, and Indian tribes to work to clarify and reaffirm the intent of the law. If the intent is to promote Indian self-determination, defined as active, meaningful Indian participation in their health services systems, then the IHS contracting process should be modified further to serve that purpose, and efforts should be made to achieve greater consistency among IHS areas.

Another basic issue regarding the self-determination process remains to be considered: What would be the effects of Indian self-determination carried to an ultimately successful conclusion? What if most tribes were to contract to manage their entire service units? For one thing, integration of IHS-operated and tribally operated services would be a greater problem than it is today. What would happen to IHS headquarters and area office staff if 638 contracts were to increase from the current 20 to 30 percent of IHS clinical services to 50 percent or more? The status of Federal employees then would be a major concern.

The overall costs of greatly expanded tribal management of the Indian health care system should be considered. Each tribal contractor may find it necessary to duplicate at greater cost certain support functions that are now provided by IHS. To minimize costs, some support functions might be separated from direct care delivery and provided to tribal 638 contractors by special area-level organizations, like the present area offices, at lower costs than each contractor would pay individually. Areawide buyers groups could be organized to obtain discounts on supplies. Areawide 638 employee benefits packages and malpractice insurance plans could contribute to more cost-effective operations. Third-party collections and technical support also might be better provided at an area level. IHS area office staff could assume some of these roles. Areawide service staff would not have to be tribal employees, but tribal contractors should have a role in directing the support services.

The administrative problems of Indian self-determination that have been experienced by IHS and the tribes can be reduced by continued cooperative efforts. Actions such as those briefly described above are implementation and management alternatives. Another management action would be to assume more responsibility for administering ongoing (renewal) self-determination contract programs directly from IHS headquarters, leaving area office staffs more time to provide technical assistance in 638 contract proposal development and the implementation of new 638 contract projects. These and other actions could be considered more productively within a clarified policy framework that reflects a consensus of tribal organizations, IHS administrators, and Congress about the intent and objectives of the Self-Determination Act.

RESOURCE ALLOCATION IN IHS

Introduction

Most Indian tribes and all IHS area offices have opinions about the methods and results of IHS's approach to resource allocation: none of the areas is satisfied that it is receiving adequate resources. In part, this view reflects dissatisfaction with the overall level of IHS appropriations. In addition, however, there is a general belief that IHS is not allocating resources among its areas as equitably and cost-effectively as it could. These issues of equity, a rational basis for resource allocation, and the most cost-effective use of IHS's limited resources were debated at all of OTA's regional meetings.

The present distribution of IHS facilities, manpower, and programs among the 12 IHS areas is not the result of health systems planning. Instead, it has evolved over many years in response to congressional appropriations and directives and the administrative decisions of Federal agencies, especially BIA and IHS. Historically, Federal health services for Indians have been concentrated on the large, reservation-based Indian populations in the American West, and some of the smaller groups and tribes lacking Federal recognition have been neglected. IHS regulations state that it is not obligated to provide the same range and level of services in all IHS areas (42 CFR 36.11 (c)), because IHS is not a Federal entitlement program. The courts have determined, however, that if resources are not adequate to meet all needs, IHS is responsible for allocating available resources among its eligible population groups on a rational basis.

In order to support the existing network of facilities and programs, IHS allocates its annual appropriations on the basis of "historical" or "program continuity" budgeting: that is, each area can expect to receive its base budget from the previous year, plus a share of funding increases equal to the percent increase in the IHS budget. Exceptions to this general allocation rule are made when Congress earmarks special program funds for certain areas, or when an area secures new IHS facilities that bring with them increased levels of staffing and support resources. The lack of coordination between the IHS facilities construction program and IHS clinical services reduces the cost-effectiveness of the overall system.

Resource allocations from IHS headquarters to its area offices are not based on the size of the service population, the relative health status and particular service needs of the population, the historical demand for services in the area, or the availability of alternate, non-IHS resources. Contrary to the perceptions of many tribes, the annual resource requirements methodology (RRM) application process, which estimates resource needs by service unit and area based on workload history and population projections, does not enter into the allocation formula except to distribute a small annual equity fund. Although IHS areas agree that the current resource allocation system is not satisfactory, they have not reached consensus on how the allocation formula should be revised.

The uneven, unplanned distribution of resources among the 12 IHS areas can be documented in a number of ways. Although tribes do not generally support a per capita approach to resource allocation, recognizing that the costs of health care and the mix of IHS direct, contract, and non-IHS alternate resources vary substantially from one area to another, any analysis of per capita budget allocations results in a wide range of figures. The area populations applied in per capita calculations are subject to particular debate, because IHS uses estimates derived from the 1980 U.S. census which, it is argued, overcounts the Indian population in some areas and undercounts in others. Variations among the areas in determining who is eligible for IHS services also affect estimates of the base populations.

Table 6-4 shows that based either on the IHS census-based area service populations or on estimated user populations derived from other sources, per capita dollar resources are unevenly distributed among IHS areas. IHS service population estimates yield 1985 per capita allocations ranging from $497 in the Portland IHS area to $1,633 in the Alaska area. Four areas (California, Portland, Oklahoma, and Navajo) received per capita allocations below the IHS average, and Bemidji and Nashville were not far above average. Estimated IHS user population figures, on the other hand, resulted in a range of from $552 per capita in the Navajo area to the high in Alaska. Areas below the IHS average per capita allocation were Oklahoma, Navajo, Portland, and Bemidji. Oklahoma area per capita allocations were low, in part, because the entire State is a contract health service delivery area, and therefore all Indian residents are IHS-eligible and potential users, whether they rely on the IHS system or not. Areas that are dependent on IHS contract care also ranked relatively low in per capita funding. It is apparent, however, that the accuracy of the service population figures is the critical factor in equitable per capita resource allocations.

Because the largest portion of the IHS budget is dedicated to clinical services delivered by direct care hospitals and clinics, resource allocations by area follow closely the distribution of IHS and tribally operated health facilities. Figure 1-7 in chapter 1, the map locating IHS and tribal hospitals and clinics, illustrates that facilities are not equally available and accessible to Indians in all IHS areas. Descriptions of the location and range of services offered by IHS direct care, contract care, and urban Indian health programs in chapter 5 also support the conclusion that the present distribution does not offer equal access to comparable types of services. The California and Portland IHS areas have no IHS hospitals at all, and only two of the widely scattered tribes in the

Table 6-4.—IHS Budget Allocations by Area With Estimated Per Capita Allocations, Fiscal Year 1985

		1985 IHS service population		1985 IHS user population	
IHS area	Fiscal year 1985 allocation	Population estimate[a]	Per capita allocation	Population estimate[b]	Per capita allocation
Aberdeen	$ 74,270,100	72,679	$1,021.89	72,679[a]	$1,021.89
Alaska	119,792,600	73,351	1,633.14	73,351[a]	1,633.14
Albuquerque	53,365,300	52,471	1,017.04	51,363[c]	1,038.98
Bemidji	39,332,100	48,245	815.26	44,337[c]	887.12
Billings	51,495,000	41,326	1,246.07	38,470[c d]	1,338.56
California	31,243,300	73,414	425.58	26,640[e]	1,172.80
Nashville	32,421,600	36,413	850.39	28,696[f]	1,129.83
Navajo	106,834,600	166,493	641.68	166,493[a]	641.68
Oklahoma	98,540,400	195,346	504.44	178,456[c]	552.18
Phoenix	88,369,600	84,516	1,045.60	79,502[c]	1,111.54
Portland	49,198,500	98,996	496.97	62,380[f]	788.69
Tucson	17,796,000	18,332	970.76	15,959[c g]	1,115.11
IHS area totals	$762,659,100[h]	961,582	$ 793.13	838,326	$ 909.74

[a] IHS census-based eligible service population estimates, 1985. When estimated user population counts from other sources exceeded census-based estimates, IHS Office of Program Statistics elected to use the census-based estimates (fourth column).

[b] Fiscal year 1985 population estimates developed by IHS Office of Program Statistics, recommended for use in fiscal year 1986 allocation.

[c] Estimate modified by special computer routine to remove duplicates from ambulatory patient care records.

[d] Based on contract workload data.

[e] Based on special count of users from individual California tribal projects.

[f] Based on IHS area office user count data.

[g] Includes enrollment in Pascua-Yaqui health maintenance organization.

[h] This sum of IHS area allocations in fiscal year 1985 (final as of 9/26/85) excludes funding for IHS headquarters functions in Rockville, MD, and Albuquerque, NM.

SOURCE: U.S. Congress, Office of Technology Assessment, based on data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Office of Program Statistics, Resources Management and Program Statistics Branches, 1985.

Nashville area have access to IHS or tribal hospitals. In these areas, IHS-eligible Indians must rely primarily on their contract care programs for inpatient services, but limited contract care budgets often force rationing of contract referrals to emergency and life-threatening conditions only. In contrast, areas that have IHS hospitals and clinics also have contract care budgets to supplement their direct services. The present approach to resource allocation does not provide a comparable package of services in all areas, nor does it compensate IHS areas that are dependent on contract care for their lack of IHS direct services (although a combined allocation was recommended by the Director's Contract Health Services Task Force in 1983, as discussed below).

A comparison of IHS staff assignments relative to inpatient and ambulatory care workloads among the 12 areas also was described in chapter 5 (see table 5-5). While the average throughout IHS in fiscal year 1984 was 178 clinical workload units per clinical staff position, that measure ranged from a low of 152 workload units per position in the Albuquerque IHS area to a high of 243 units per position in Aberdeen. Such disparities in the workloads carried by IHS staff in different areas support complaints from some areas (Aberdeen, for example) that staffing shortages not only limit the range and volume of services that can be delivered, but unusually heavy workloads also discourage the recruitment of additional staff.

Perhaps the most detailed and systematic documentation of the uneven distribution of IHS resources is generated by the IHS's equity fund allocation formula. As will be described later in this section, IHS allocates an annual equity or special fund by a method that incorporates RRM criteria to determine resource requirements, available resources, and unmet resource needs at the service unit and tribal levels. This formula allows tribes to be ranked by resource deficiency levels in five groups, from level I (0 to 20 percent deficiency) to level V (80 to 100 percent deficiency). Following distribution of the 1985 special fund, 46 of 266 tribes ranked in level I, 99 in level II, 101 in level III, and 20 in level IV. There were no tribes in level V, the group with 80 to 100 percent resource deficiencies. This means that by IHS's own assessment, 121 tribes, or 45 percent of all tribes, were at least 40 percent deficient in their estimated resource needs. The equity formula thus provides evidence of differences in resource availability among IHS areas, and among service units and tribes within IHS areas, which is another aspect of the debate about equity in resource allocation.

Decentralization has been an explicit management philosophy in IHS for many years. Within budget categories and other constraints placed on the funds by Congress, IHS allocates its annual appropriations only to the IHS area office level and permits the areas to redistribute funds among their service units by their own methods. There have been complaints about the rationale for area-to-service-unit allocations, coming most often from smaller and recently reinstated tribes that believe they are not able to compete effectively for resources against larger, well-established tribes.

Individual service units and tribes generally do not relate directly to IHS headquarters in the budget allocation process, but some tribes maintain direct political relationships with Congress and individual members of Congress. In terms of health care, tribal political efforts most often have focused on securing earmarked funding for special initiatives and demonstration projects (e.g., hepatitis-B vaccinations in Alaska or diabetes treatment programs) and for health facilities construction and renovation projects. Facilities projects are selected and funded by Congress under procedures separate from those applicable to IHS health service resource allocations. Nonetheless, new facilities and the expanded staff and operating budgets associated with them are major factors in the overall resource allocation picture.

The limitations of reliable IHS program planning and management information pose problems in many aspects of IHS operations, including resource allocations. Sophisticated allocation formulas cannot be applied without adequate data, nor can the actual extent and impact of resource inequities be convincingly defined. Data are available, however, that could improve resource allocation decisions, given the political consensus to use them. Serious efforts have been underway to improve IHS resource allocation methods since

1980, and especially since summer 1985. These efforts, which are described below, have culminated in a new allocation formula that is proposed for application to a portion of the fiscal year 1986 appropriation. Following a brief description of the development of the RRM criteria and their role since 1981 in distributing the court-ordered annual equity funds, this section will review recent activities in IHS resource allocation and consider factors that might usefully be incorporated in any allocation formula.

IHS Resource Management in the 1970s

Overall appropriations in the 1970s reflected steady growth, and IHS headquarters allocated those funds by budget category to the area offices in keeping with the historical or program continuity budget approach. Each area office could expect to receive its recurring base budget from the previous year, plus an increase in built-in mandatory cost categories (e.g., staff cost of living, relocation expenses, and supply cost increases) equal to the percentage increase in those categories awarded to the overall IHS program.

A process of rationalizing IHS resource management methods was initiated in 1972 with organization of the resource allocation criteria (RAC) workgroup. RAC development was undertaken in an environment of general interest in health planning methods, with encouragement from the Office of Management and Budget and the Office of the Secretary, U.S. Department of Health, Education, and Welfare. RAC standards were not intended to guide the distribution of available resources among competing IHS areas and service programs, but were developed as part of a planning algorithm to quantify the resources required (primarily staffing) to provide a specific volume and mix of services. Modified versions of the original RAC criteria (now known as RRM) still are used in the annual IHS budget development process, in the distribution of equity funds, and in planning the staffing requirements for new facilities and services.

The RAC committee worked from 1972 to 1975 to develop sets of service-specific criteria that defined workload measurements and associated staffing requirements. The RAC committee was made up of IHS headquarters and area office staff, representatives of the IHS Office of Research and Development, and consultants such as health providers and industrial engineers. The analytical steps followed by the committee and its technical working groups included: 1) definition of IHS clinical service functional areas; 2) review of published criteria and standards; 3) determination of appropriate tasks within each IHS service function; 4) determination of unit times by function; 5) definition of a productive person-year, by type of staff; 6) construction of staffing tables; and 7) submission of proposed or revised criteria to expert panels and the RAC committee for final approval (218).

The original RAC criteria sets defined functions and tasks for inpatient services such as medical care, nursing, laboratory, X-ray, and facility maintenance, to name 5 of the 14 inpatient care components; and for ambulatory medical care, dental care, optometry, audiology, and support services (169). In developing its criteria and standards, the RAC committee drew on the literature, academia, and professional associations for existing manpower criteria, and on industrial engineering techniques including time-and-motion studies. Field work specific to the IHS system was done only for ambulatory care services. Estimates of the times and frequencies of performing defined tasks, by type of service and provider, were incorporated into mathematical models to generate staffing tables that displayed numbers of staff required for each workload level (218).

RAC criteria sets, most of which were detailed to the level of available and required annual service minutes, by type of service and provider, deliberately reflected the staffing levels needed to provide health services under ideal circumstances. Although this was a logical planning approach, the decision to base RAC on ideal service delivery conditions has resulted in a large gap between required resources, as estimated by RAC criteria, and the resources actually available to IHS. Thus, it has produced the awkward deficiency level approach to assessing relative health resource needs among the service units.

Some RAC criteria sets have been updated for changes in technology and delivery patterns, but they are not all updated on a routine basis. In the 1983 edition of the RAC reference manual, most of the inpatient care criteria dated from 1977 to 1979, while ambulatory services reflected 1980 to 1983 revisions (169). A quick review of all resource allocation criteria sets was completed in summer 1984 by an in-house group known as the "interim fix" committee. That committee reduced staffing requirements overall by 17 percent, incorporated support costs, and changed the measure of resource requirements from staff positions to dollars (214). Another review of the criteria sets in fall 1985 established limits to the range of variation in the workload factors (214).

Late in the 1970s, RAC became known as the resource requirement methodology, or RRM. As then described, the purpose of the RAC/RRM system was "to provide the Indian Health Service with a comprehensive, systematic, and consistent process for determining resource requirements, primarily manpower, as well as a process for distributing nonearmarked program increases (positions and funds) to the Area/Program Offices" (169).

In the annual IHS budget application process, service unit and area office staff follow detailed instructions in the RAC/RRM manual to project service unit workload and resource requirements for each functional program. In a process known as demand forecasting, the previous year's workload (utilization) figures and IHS census-based population estimates are applied to determine the numbers of staff, by type, that would be needed to deliver the expected volume of each type of service. Numbers of required staff then are converted to personnel costs using an average cost per position from IHS headquarters, support costs associated with each service are calculated, and these combined costs represent total resource requirements for each service unit. For a new facility or service that has no workload history, utilization experience from similar IHS facilities is applied to the estimated new service population. Results of the RRM application process by service unit are aggregated to the area office level and then incorporated by IHS headquarters into the overall IHS budget proposal. Therefore, the RAC/RRM criteria do play a role in developing the annual IHS budget request, but neither DHHS nor Congress is obligated to provide the level of resources needed according to the RRM application.

The IHS Equity Health Care Fund

IHS's methods of allocating resources among its area offices, service units, and tribes were the target of legal challenges in the late 1970s. One case, *Rincon Band of Mission Indians v. Califano* (104), resulted in a court order directing IHS to take steps to reduce the disparities in funding among tribes. The *Rincon* case was a class action suit filed in May 1974 by certain groups of California Indians who claimed that IHS had illegally denied them health care services comparable to those provided to other American Indians. The plaintiffs documented that from 1968 through 1978, IHS had allocated only 2 percent of its annual appropriations to California Indians who, according to the 1970 census, represented over 10 percent of the IHS service population (132). (See ch. 2 of this assessment for a more detailed discussion of *Rincon* and related decisions.)

Both the U.S. District Court for the Northern District of California and the U.S. Court of Appeals for the ninth circuit ruled for the plaintiffs. The Court of Appeals criticized the long-standing IHS practice of basing annual resource allocations on the previous year's budget. The courts found that IHS had not established that its funding decisions affecting California Indians were made on a rational basis, and ruled that IHS was "obligated to adopt a program for providing health services to Indians in California which is comparable to those offered Indians elsewhere in the United States" (132). Neither court specified how IHS was to implement this directive, but both cited *Morton v. Ruiz* (89), a case involving BIA, as precedent for invalidating IHS's program continuity funding approach. The *Ruiz* decision, in brief, stated that if an agency did not have adequate resources to serve all eligible beneficiaries, the agency was obligated to allocate those limited resources equitably by the consistent application of reasonable distributive standards.

In response to the court order, IHS proposed to allocate an equity fund by a needs-based formula as its means of achieving comparability among tribes in health care funding. For fiscal year

1981, the House and Senate Appropriations Committees earmarked $7,856,000 of the $594 million IHS health services appropriation, or 1.3 percent, as an equity health care fund (note that $594 million was the initial appropriation, prior to a supplementary appropriation for personnel cost increases that brought the final fiscal year 1981 appropriation to $613 million). Questions about the application and effects of the IHS equity fund mechanism were raised soon after its initiation when GAO analyzed the fiscal year 1981 equity distribution. Fifty-one tribes that ranked in level V (80 to 100 percent resource deficiency) in February 1980 received 1981 equity funds, and only two tribes remained in level V in November 1981. GAO concluded, however, that because of weaknesses in the allocation methodology, the tribes that received 1981 equity funds may not have been those with the greatest relative health services needs (132).

Although equity funds totaling $32,362,000 were earmarked for fiscal years 1981 through 1984, their shares of the overall IHS budgets were less than 2 percent per year, as illustrated in table 6-5 (135). The effects of equity funds on service unit budgets are cumulative, however, because equity awards become part of the recurring base budget and thus are assured in future years. The California Indians received $11,134,000 (34.4 percent) of the 4-year equity funds. Congress did not earmark equity funds in fiscal year 1985, but IHS, still under court order to reduce funding disparities, set aside a special fund of $5 million for an equity distribution (78).

The equity fund allocation methodology attempts to determine unmet resource needs by tribe (not by service unit, although the method applies equally well to service units), on a systematic, uniform basis. The methodology: 1) estimates resource requirements for all "tribal and non-tribal entities" (except urban Indian groups) using IHS population estimates, utilization experience, and RRM criteria sets; 2) determines the health resources available to each tribe, including IHS and other Federal, State, local, and private resources; 3) divides unmet need (the difference between resource requirements and available resources, expressed in dollars) for each tribe by its estimated resource requirement to define a percentage deficiency; and 4) ranks all tribes in five levels of resource deficiency, from level I (zero to 20 percent deficiency) to level V (80 to 100 percent deficiency). Available equity funds then are awarded to tribes with the greatest levels of deficiency (17). A newly recognized tribe could be 100 percent resource deficient, if it had not previously received IHS funds; and in fact the equity fund has been an important source of initial funding for newly recognized tribes.

The resources available to a tribe are defined as its recurring base budget from the previous year (including previous year equity funds), plus other available non-IHS health resources. IHS officials believe that data on Medicare and Medicaid resources are reasonably reliable, but other sources including State, local, and private providers and insurers are not well-reported (17,214). Tribes are asked to self-report these other resources, but

Table 6-5.—IHS Equity Health Care Fund Appropriations, Fiscal Years 1981-84, and IHS Special Fund, Fiscal Year 1985[a]

	Fiscal year				
	1981	1982	1983	1984	1985[a]
Appropriation	$7,856,000	$7,636,000	$7,000,000	$9,870,000	$5,000,000
Percent of total IHS appropriations	1.13%	1.13%	0.9%	1.19%	0.6%

[a] Congress did not appropriate an equity fund in fiscal year 1985. Instead, IHS set aside a $5 million special fund from its hospitals and clinics budget that was distributed by the equity formula.

SOURCES: **For fiscal years 1981-84:** Data from the Indian Health Service published in U.S. Congress, House of Representatives, Committee on Energy and Commerce, staff report for the Subcommittee on Health and the Environment, "Indian Health Care: an Overview of the Federal Government's Role," committee print 98-Y, U.S. Government Printing Office, Washington, DC, April 1984. **For fiscal year 1985:** U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, 1985.

clearly it is not advantageous for them to do so and thus reduce their estimated unmet resource needs.

After distribution of the 1985 special equity fund, 46 of 266 tribes had resource deficiencies of 20 percent or less (level I); 99 were in level II; 101 in level III; and 20 tribes ranked in level IV with resource deficiencies exceeding 60 but less than 80 percent (see table 6-6). There were no tribes with resource deficiencies exceeding 80 percent (level V) (189). It is interesting to note that according to IHS's equity methodology, the Rosebud Sioux service unit in South Dakota, which frequently is cited as an example of poor quality Indian health care, now ranks among the 46 best-served tribes with a resource deficiency of less than 20 percent. Peculiarities such as this raise questions about the validity of the equity formula and its supporting data. Nonetheless, the special equity fund was the only portion of the fiscal year 1985 IHS allocation that was distributed on a basis other than program continuity.

Resource Allocation in the 1980s

From October 1982 through publication of its report in February 1983, a special interagency IHS Director's Task Force on Contract Health Services analyzed a number of problems affecting IHS operations. Among its recommendations, the task force suggested that improvements be made in IHS resource allocation methods (181).

The task force concurred with judicial directives that IHS should develop and apply rational, equitable methods of allocating its appropriated resources. Furthermore, it concluded that a formula should be developed to combine direct and contract care resource needs, and it should be based on enrolled user populations rather than IHS eligible service population estimates (181). The task force observed that IHS's long-standing practice of allocating funds on the basis of program continuity, combined with the earmarking of funds in congressional appropriations, had contributed to substantial inequities in the funding of health services among IHS service areas and tribes.

The contract health services task force urged that a new set of allocation formulas be developed to take into account a defined service population, reasonable estimates of third-party resources, the unique geographic, economic, and health status characteristics of the areas, and incentives for good management. A model resource allocation formula was proposed that defined an area's annual need for clinical services funding by its actual user population, multiplied by user per capita costs of hospital and ambulatory care services, respectively, minus estimated third-party reimbursements. Individual IHS area dollar requirements then would be divided by the combined requirements of all areas and the resulting percentage multiplied by the congressional appropriation for IHS clinical services. The task force recommended that IHS areas use this same approach to determine service unit allocations (181).

Although these specific recommendations of the contract health services task force were not adopted, they provided the starting point for work during the summer of 1983 by another in-

Table 6-6.—IHS Ranking of Tribal Groups by Deficiency Level for Equity Health Care Fund Distribution, 1980-85

		Number of tribes			
Percent deficiency	Deficiency level	As of February 1980	As of November 1981	As of April 1984	As of March 1985
<20	I	1	10	36	46
21 to 40	II	15	30	60	99
41 to 60	III	88	95	156	101
61 to 80	IV	93	107	0	20
81 to 100	V	51	2	0	0
IHS total		248[a]	244[a]	252[a]	266[a]

[a] Totals vary from year to year because of newly recognized tribes and changing tribal health consortiums.

SOURCES: U.S. Congress, General Accounting Office, "Indian Health Service Not Yet Distributing Funds Equitably Among Tribes," publication GAO/HRD-82-54 (Washington, DC: U.S. Government Printing Office, July 2, 1982); and tribal rankings for 1984 and 1985 from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Planning Branch, 1985.

house group, the Resource Allocation Methodology (RAM) Task Force (182). The objective of the RAM approach was "to promote cost-effectiveness and quality of existing IHS services and to promote equal access to equivalent health care to all eligible Indians" (182). The RAM task force defined equity as "relative equal access of the service population to equivalent health care services," and recognized both the need for continuity in serving current user populations and the need to address limited access to IHS services in some areas. A two-part approach to allocating IHS resources was proposed: resources to maintain existing services (the bulk of the funding) would continue to be allocated primarily on a historical funding basis; but a portion of the resources would be distributed to selected areas to compensate for their lack of access.

To determine appropriate resource compensation for underserved areas, utilization rates for inpatient and ambulatory care (combining IHS direct services and contract care programs) would be calculated for each area and compared with utilization rates for IHS as a whole (rates based on summed area figures). If an area's utilization rates were lower than the IHS average, the difference would figure into a formula to generate additional resource requirements. The RAM task force did not fully develop this part of its approach because of data limitations, but it assumed that below-average utilization reflected a lack of access to services and was a proxy for unmet need (182). Some of the task force's proposals were pilot tested by IHS headquarters staff from November 1983 through January 1984 with verified area workload and cost data. IHS concluded that the approach that incorporated RRM criteria to determine existing service requirements, which was similar to the equity distribution formula, was sound.

In fiscal year 1984, IHS received program increases of nearly $42 million in budget categories for hospitals and clinics, contract health services, and support to tribally operated services. Allocation of the hospitals and clinics program increase of $9.5 million reflected a measure of unmet need based on RRM, but it was the only one of the three special allocations that incorporated RRM. Of the $27.4 million increase for contract care, $9.4 million was withheld and allocated administratively to cover priority I emergency care. The remaining $18 million was allocated among IHS areas by a method that incorporated actual rates of cost inflation experienced in each area. There were substantial variations in those rates, as area offices appear to have little control over increases in charges by non-IHS contract care providers. A total of $5 million in additional funding was available in 1984 to support tribally operated 638 health programs. It was allocated by an inflation-based model, in which the same Office of Management and Budget inflation rate was applied to all IHS areas, with the result that all areas received the same percentage increase (7.6 percent) over fiscal year 1983 funding (222).

Combining the allocations of fiscal year 1984 increases in hospitals and clinics, contract care, and tribal support, the Aberdeen IHS area received the largest percentage increase (about 26 percent above its 1983 recurring base budget), although its overall budget was relatively small. Tucson received a 15-percent increase on a small budget, and the Bemidji, Navajo, and Portland IHS areas received increases of about 10 percent each. California received the smallest increase, 6.7 percent.

This discussion of recent modifications in IHS resource allocation methods illustrates that when additional funds have been available, as they were in fiscal year 1984, efforts have been made to distribute at least part of the increases to achieve a more equitable balance in funding and service availability among the areas. It is not surprising, however, that there remains a great reluctance to redistribute area recurring base budgets. There were virtually no additional moneys in fiscal year 1985, and the methods tested in 1984 were not used again. The fiscal year 1985 distribution followed the program continuity allocation process of supporting recurring base budgets, with a special fund of $5 million withheld for an equity formula distribution. In addition, a small reserve of about $2 million was distributed from headquarters to meet emergencies during the year (214).

Allocation of the fiscal year 1986 IHS appropriation had not been completed by the end of February 1986, due to uncertainties about final 1986 funding levels and proposed modifications to the resource allocation process. IHS was appropriated $818 million for health services and nearly $47 million for facilities construction under the fiscal year 1986 continuing resolution (91). The Gramm-Rudman legislation (Public Law 99-177), effective March 1, 1986, reduced IHS appropriations by 1 percent in service delivery categories and 4.3 percent in administrative functions, resulting in losses of $10.4 million to health services and $0.4 million to facilities construction budgets. Still pending in March 1986 were recisions proposed by the Office of Management and Budget amounting to an additional $32 million cut in IHS services and $44 million in facilities construction (91). Because Congress would have to adopt the Office of Management and Budget recisions in order for them to take effect, it is thought that they will fail; but the issue remained unresolved in March 1986.

Since fall 1985, an IHS workgroup known as the Operations Analysis Project has been considering possible modifications to the IHS resource allocation process. The work of this group resulted in a detailed draft proposal to the IHS Director early in 1986. RRM criteria sets (modified by screens, or limits in the range of acceptable workload values) will be applied at the service unit level and aggregated to area offices, allowing the areas to be ranked by levels of deficiency and additional funds to be distributed to compensate the most deficient areas (214). The basic approach would be similar to the equity fund formula: use of RRM criteria sets, actual utilization data, and enrolled (not census-based) population figures to identify area resource requirements; quantification of IHS and non-IHS available resources; estimation of a health status indicator, years of productive life lost, based on mortality rates, by area; and comparison of resource requirements against available resources, adjusting for health status and resource deficiencies, to generate a final allocation formula by IHS area.

The IHS Director must determine what amount of funding will be subject to the new allocation formula, what amount of non-IHS resources (collections from Medicare, Medicaid, and other third-party resources) should be offset against total resource needs, and how two new weighting factors—the area percentage of the IHS weighted resource deficiency, and the area percentage of IHS total years of productive life lost—should figure in the formula (214). The IHS Director consulted on these questions with the area directors in meetings held in late fall 1985 and March 1986. The IHS area directors have agreed that any funding increases over fiscal year 1985 base budget levels (including mandatory budget categories) will be distributed by a special RRM-based, equity type formula; but no area will receive less than its 1985 funding (the areas simply will receive varying amounts of the additional funds). Furthermore, area population figures will be based on the patient registration system, rather than on IHS census-based estimates of the eligible service populations. The resource allocation formula that ultimately will be applied, however, will be decided when the final level of fiscal year 1986 funding is known.

Conclusions

IHS traditionally has distributed its annual appropriations among its areas by budget category, according to each area's share of the budget from the previous year. Thus, there has been incremental funding growth to support existing programs and facilities. The RAC/RRM system, developed in the 1970s to rationalize planning for staffing needs, has been used since 1981 in the court-ordered distribution of IHS equity funds. The RRM criteria, however, do not play a major role in the overall IHS budget allocation process, which continues to be driven by the historical or program continuity funding approach. Even if RRM criteria were incorporated in IHS allocation methods, distributions based on RRM criteria, workloads, and population estimates would not factor in relative health status, health needs, special geographic problems, availability of alternate resources, or other measures that could provide for more rational and cost-effective decisionmaking. When health care needs do not result in service utilization, as may be the case in areas where IHS and other services are not readily available and accessible, those needs usually are not taken into account at all.

Although the equity fund distribution appears to follow a straightforward approach incorporating the RRM criteria, the formula is vulnerable to problems of data quality and validity, completeness of reporting, and the apportionment of population estimates. The need to make assumptions about data sources and processes in order to apply the methodology can result in unpredictable and unintended outcomes. IHS has responded to criticisms such as these with efforts to improve supporting data systems and to increase consistency in application of the equity formula. After 5 years of equity fund distribution, some tribes (especially newly recognized tribes) have benefited; but because the equity formula has been applied to less than 2 percent of the overall IHS budget each year, the approach has not produced significant changes in area budget shares. A resolution by the Navajo nation (120) and comments from the Northwest Portland Indian Health Board (95) and other groups indicate that the IHS equity approach so far has been an unsatisfactory means of attempting to equalize resources and services among tribes.

Recent IHS efforts to refine a resource allocation formula, like the equity formula, that could be applied to redistribute a portion of IHS area recurring base budgets (as well as to budget increases or reductions) are encouraging. Given the practical and political arguments against a sudden, substantial redistribution of IHS resources, greater equity in overall resource distributions could be achieved gradually by the allocation of designated funds by a needs-based formula. Congress has earmarked IHS funds for equity distribution in the past and could continue to do so, pacing the redistribution by the amount of earmarked funds. Likewise, appropriations could be earmarked for development of the needed IHS patient care and program management information system. Congress has expressed support for the concept of comparable service packages in all IHS areas, an approach that is supported by a number of tribal organizations as well.

There are reasons to expect that equity and cost-effectiveness in IHS resource allocation will continue to be important issues for the program, and in fact may become more critical in the near future. In the past, IHS was able to allocate budget increases from year to year; but in the future, it may be required to manage stable or reduced overall appropriations (how the proposed 1986 resource allocation formula might be applied to budget reductions, instead of increases, is under study in IHS). Although Gramm-Rudman reductions in the fiscal year 1986 IHS budget were limited to 4.3 percent of administrative and 1 percent of service costs, future applications of that law would have serious cumulative effects.

In many IHS areas, limited funding already forces rationing of services in the IHS contract care program, and overall budget constraints will increase pressures to ration those services. At the same time, if adequate funding is not available to maintain IHS facilities and equipment, those facilities will deteriorate and the capacity to deliver services directly could decline and force greater reliance on contract care purchases. IHS already experiences shortages of qualified medical staff, and when the National Health Service Corps is phased out (the last assignees will be available in 1990), those shortages could become critical. Finally, IHS is planning to publish new rules governing eligibility for IHS services, which could result in a realignment of IHS area service populations. All of these factors will focus greater attention on the cost-effectiveness of IHS resource allocation decisionmaking, especially if IHS is in a position to distribute budget losses rather than gains, and will intensify the debate about the data, allocation criteria, and formulas that should be used.

THE PROBLEM OF HIGH-COST CASES IN THE IHS CONTRACT CARE PROGRAM

Introduction

The IHS contract care program and its management at the service unit and area office levels were discussed in chapter 5. Given the difficulties some service units experience in purchasing only the most urgently needed services with their limited contract funds, it is not surprising that one or more extremely costly cases could absorb a large part of a service unit's contract care budget. Not only is it difficult for service units to cover the costs of these so-called "catastrophic cases," but because most of the high-cost cases involve life-threatening conditions that take precedence over less urgent care, the entire contract care delivery system may be disrupted. In areas that do not have IHS direct care hospitals to fall back on for basic inpatient services, the budget effects of high-cost cases can result in the deferral or denial of substantial amounts of contract care.

The problem of catastrophic costs in the IHS contract care program should not be confused with the subjects of catastrophic illness and catastrophic health insurance as they generally are understood in the field of health research. Catastrophic costs usually refer to the devastating financial effects that extremely costly and long-term illnesses can have on individuals who may have no insurance or who may be inadequately insured. In the IHS contract care program, the costs of catastrophic illnesses not covered by other payers are borne by IHS, not by individual Indians (although there may be cases that are disputed between IHS and another payer as to which is the responsible party, leaving the individual Indian caught between the two). Catastrophic costs most often are defined in terms of out-of-pocket costs to individuals exceeding a certain percentage of individual or family income, or as total costs per case in the range of $20,000 to $25,000 and up. In IHS, on the other hand, the discussion of catastrophic costs has revolved around the idea of setting a threshold for individual service unit obligations somewhere between $10,000 and $20,000 per case.

The negative effects of high-cost cases on contract care program management have been felt for several years, and some IHS areas have taken steps to assist their service units in dealing with the problem. The most frequently used mechanism is an areawide contingency fund that is withheld from the area's annual contract care allocation and made available to service units for cases whose costs exceed a predetermined threshold. This approach currently is applied in the Alaska and Portland IHS areas. Other areas have expressed interest in setting an upper limit on their obligation to pay for individual high-cost cases (a cap was imposed in the Oklahoma City IHS area until recently), but this approach has been determined to be illegal by the IHS general counsel (60).

Congress addressed the problem of high-cost cases in the Indian Health Care Amendments of 1984 (vetoed by President Reagan). A provision earmarking the sum of $12 million for a catastrophic health emergency fund was reintroduced in 1985 versions of the amendments. The fund would be used to meet "the extraordinary medical costs associated with the treatment of victims of disasters or catastrophic illness falling within the responsibility of the Service" (133).

The proposed catastrophic fund would not be apportioned among the IHS areas and service units, but would be administered by IHS headquarters. The legislation provided that catastrophic conditions would be defined solely in terms of cost, not cause, by a threshold to be established between $10,000 and $20,000 per case, and all IHS costs above the threshold would be applicable to the catastrophic fund. The fund was seen primarily as a means of providing temporary budget relief to area and service unit contract care programs and to the contract care programs operated by tribes under the Self-Determination Act (60).

Although the catastrophic fund was not cited as a reason for the President's veto of the 1984 Indian Health Care Amendments, Administration officials in testimony on the 1985 amendments stated their opposition to it. The Administration position was that separate authorization was not necessary, because IHS already can shift resources within its system to cover the costs of unusually expensive contract care cases (136).

During congressional review of the 1984 Indian Health Care Amendments, it was found that neither the number of high-cost cases in the IHS service population, nor the costs, nor the causes of those cases could be documented. In response to questions from Congress, IHS estimated that there were about 400 cases in fiscal year 1983 for which costs of at least $25,000 per case were incurred by the IHS contract care program. The total cost of those 400 cases to IHS was estimated at $15 million. The amount of high-cost care for eligible Indians that was funded at least in part by third-party payers, including Medicare, Medicaid, and private insurance, could not be determined. IHS suggested that trauma (especially from automobile accidents) accounted for a large number of the cases, and that end-stage renal disease and neonatal intensive care represented catastrophic costs when patients did not have third-party coverage (172). Because of this lack of information to describe the IHS high-cost care problem, OTA was specifically requested to address the matter.

Data on high-cost cases that have been obtained from the IHS contract care program are incomplete and poorly identified. Data items are not always uniform in records from different areas, and descriptive diagnoses have been reported by persons unskilled in extracting information from medical records. It is not known if all cases meeting the selection criteria (an IHS obligation of $10,000 or more per case) were reported to headquarters. Costs per case are incomplete because most area offices were able to provide hospital costs only. Thus, it is not possible to determine from available data whether what is called a problem of catastrophic care is in fact a problem of excessive incidences of catastrophic conditions in the Indian population, or whether it is more properly described as a budget management problem. Lacking documentation of unusually high incidence rates, and because IHS itself defines catastrophic cases strictly in terms of costs, it seems most useful for the present analysis to address the situation as a budget management problem within the IHS contract care program.

Data on IHS High-Cost Cases

Special IHS Data Collection Activities

In the fall of 1984, possibly in anticipation of passage of the Indian Health Care Amendments and the consequent charge to IHS to implement the catastrophic health emergency fund, staff of the IHS headquarters contract care program began an informal data collection effort to identify high-cost cases. This effort followed the steps outlined below (86):

1. IHS headquarters searched the automated contract care billing files, known as the "piggyback" data system, for all bills in which the IHS obligation for hospital charges was $10,000 or more (associated physician fees, laboratory, pharmacy, operating room, and other charges were not included if billed separately from hospital charges). This initial search was performed during late October and early November 1984 on the file of processed fiscal year 1984 contract care bills. Inpatient stays for high-cost cases often exceed 45 days; thus it is likely that an unknown number of 1984 cases was missed because bills had not yet been filed and processed.
2. Headquarters listed the bills by area, sent the lists to the IHS area offices, and requested that contract care authorization forms (Health Services Administration forms 43 for inpatient care or 64 for other than inpatient or dental care) be pulled for each of the bills, photocopied, and returned to headquarters. No attempt was made at headquarters, the area offices, or service units to aggregate all bills associated with the same patient and episode of care (except, it has been reported, in the Phoenix and Alaska areas). This is another factor that may contribute to an undercounting of cases costing the IHS $10,000 or more.
3. The IHS areas filled the headquarters request as best they could given their different manual and automated contract care record systems. As a result, there is variability in the data items that each area could provide. The service units were involved in pulling the contract care authorization forms for each listed bill.
4. When the contract care authorization forms were received at headquarters, they were checked against the lists of requested forms and edited informally; but there is no record of what followup activities, if any, were carried out. Bills were excluded if they represented payment for a block of services to a group of patients (a standing, negotiated service contract); for example, laboratory services for all service unit contract care patients for the year.
5. Individual high-cost case billing records then were entered into a personal computer system with a LOTUS program. The data items

usually included IHS area; service unit; in some cases, the name of the private provider; a document identification number, if available; one selected noncoded, nonstandardized description of the diagnosis or cause of the hospitalization; a description of one selected procedure; the amount paid by IHS on the hospital bill; the amount paid by an alternate payer, if available; and a total of IHS and alternate payer expenditures. Inpatient days per case were added in subsequent requests for fiscal year 1982 and 1983 records.

6. The preliminary data set for fiscal year 1984 consisted of 331 cases. IHS decided that in order to support further analyses, additional records were required. Following the same procedures outlined above, headquarters requested contract care authorization forms for high-cost cases in fiscal years 1982 and 1983. These records were received and entered in the personal computer system beginning in April 1985.

OTA staff performed preliminary analyses on the 331 cases for fiscal year 1984 (the number of cases grew to 390 by the time of the final OTA analysis described later in this section). In response to the interests of congressional committees and OTA's Indian health advisory panel, OTA began to work closely with IHS contract care program staff to design a more complete and formal study of high-cost cases. Negotiations regarding this study went on from April through June 1985, and resulted in a methodology prepared by IHS that would manipulate automated data files to generate information on the numbers, causes, and total costs of the high-cost cases. During the summer, however, it became apparent that although the extensive reprogramming that would be required for the study was feasible, it could not be done by the IHS data center in Albuquerque. The project was referred to the PHS computer center in Rockville for cost estimates. In September, discussions with IHS staff made it clear that the work would not be completed in time for inclusion in the OTA study (45). At that time, OTA again began to explore use of the high-cost case data collected by the IHS contract care program for fiscal years 1982, 1983, and 1984, described above.

It should be understood that the information presented here is rough, but it is the best that was available to describe high-cost cases in the IHS contract care program. Unfortunately, many of Congress' specific questions about total costs per case, the role of third-party payers, accurate and detailed causes of these costly hospitalizations, and patient demographics cannot be answered on the basis of the information at hand. Answers to questions such as these are necessary before methods of financing and insuring IHS high-cost cases can be seriously considered.

Analysis of the IHS High-Cost Case Data Set

The data presented here are the product of work with the IHS file of 1,295 high-cost cases from fiscal years 1982, 1983, and 1984 (123). Problems with these data already have been noted: for example, there is no way to verify that all cases are included, and in fact there is evidence that some 1984 cases were missed because the billing file was searched so soon after the close of the fiscal year. A second search of the 1984 contract care billing file in October 1985 generated 746 records of IHS hospitalization disbursements exceeding $10,000 (122). This more recent run of 746 records could not be closely compared with the 390 cases finally identified for 1984 by the IHS special data collection effort, but it represents a substantial increase over the number of cases included in the present analysis.

The reported costs in these cases are IHS disbursements for hospital care only. They do not represent total costs per case. Fiscal year 1984 data on 37 catastrophic cases from the Portland IHS area, if applicable to all areas, suggest that hospital costs alone make up about 84 percent of total IHS expenditures for high-cost hospitalizations (198). The number of high-cost cases involving IHS-eligible Indians whose bills were paid entirely by a third-party payer cannot be identified by any IHS data system; and if other payers left a residual liability to IHS of less than $10,000, the case would not have been selected for IHS special data collection.

The relative completeness and accuracy of data reporting from IHS areas are not known, but there are obvious gaps in the data. The California, Bemidji, and Nashville IHS areas reported very few cases, probably because much of the care in those areas is delivered by the tribes under self-determination (Public Law 93-638) contracts, and data from 638 programs usually are not included in the contract care "piggyback" data system that was used for IHS case selection (58). Those same IHS areas also are particularly active in collecting from third-party payers, which may have reduced the number of cases that cost IHS more than $10,000. Finally, service units such as some of those in California (e.g., Toiyabe) may rarely if ever authorize inpatient referrals, because of budget limitations, and by not incurring bills of $10,000 or more would not appear in the IHS special data set. In Oklahoma, high-cost cases are underreported because the contract care program in recent years attempted to impose a cap of $3,000 per case, thereby reducing demands on the contract care budget.

The tables that follow present numbers of high-cost cases in the IHS data file for fiscal years 1982, 1983, and 1984, respectively, by IHS area. The cases are described with total costs for the area, average costs per case and, for fiscal years 1982 and 1983, average inpatient days per case and average cost per inpatient day (Alaska did not report inpatient days, and so is excluded from the last two items).

A total of $7.9 million was spent on hospital care for 381 cases identified in fiscal year 1982 (table 6-7). The average cost per case was $20,752, and the average inpatient stay was 30 days at $684 per day. The highest average cost per case was in Alaska, at $24,272, but the Phoenix area also was high at $23,934. IHS area office sources in Phoenix report that they attempted to match all contract care bills associated with individual episodes of care, possibly including more than one hospitalization per patient. All cases with cumulative IHS disbursements exceeding $10,000 per patient per year were reported for Phoenix, which may explain in part the large number of cases from that area and their high average costs (61). No cases at all were reported for 1982 from the Bemidji, Nashville, Oklahoma, California, or Tucson IHS areas. Because of the obvious differences among the areas in their responses to the IHS headquarters data request, comparisons among IHS areas should not be overemphasized.

Fiscal year 1983 (table 6-8) is the most complete annual data set in this analysis. IHS disbursements for high-cost hospitalizations totaled $10.8 million. There were 524 cases reported from all IHS areas except California and Tucson (although Bemidji, Nashville, and Oklahoma reported few cases). The average cost per case was slightly lower than in 1982, at $20,549, and was associ-

Table 6-7.—High-Cost Cases in the IHS Contract Care Program, by Area, Fiscal Year 1982[a]

Area	Number of cases	Total cost	Average cost/case	Average inpatient days/case	Average cost/inpatient day
Aberdeen	46	$ 831,629	$18,079	43	$423
Alaska[b]	37	898,048	24,272	—	—
Albuquerque	24	401,015	16,709	28	591
Bemidji[c]	—	—	—	—	—
Billings	50	1,072,103	21,442	29	733
California[c]	—	—	—	—	—
Nashville[c]	—	—	—	—	—
Navajo	74	1,301,984	17,594	26	695
Oklahoma[c]	—	—	—	—	—
Phoenix	114	2,728,461	23,934	27	894
Portland	36	673,419	18,706	33	560
Tucson[c]	—	—	—	—	—
IHS all areas	381	$7,906,659	$20,752	30	$684

[a] Averages have been computed by area. Cases without inpatient days have been excluded from average inpatient day and average cost/day calculations.
[b] Inpatient days not available for Alaska.
[c] No data reported from Bemidji, Nashville, Oklahoma, California, and Tucson.

SOURCE: U.S Congress, Office of Technology Assessment, with data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, contract care program special data collection, fall 1984-spring 1985.

Table 6-8.—High-Cost Cases in the IHS Contract Care Program, by Area, Fiscal Year 1983[a]

Area	Number of cases	Total cost	Average cost/case	Average inpatient days/case	Average cost/ inpatient day
Aberdeen	74	$ 1,291,481	$17,452	35	$504
Alaska[b]	94	2,859,738	30,423	—	—
Albuquerque	34	682,911	20,086	28	722
Bemidji[b]	2	22,485	11,243	—	—
Billings	89	1,750,740	19,671	26	758
California[c]	—	—	—	—	—
Nashville	2	58,782	29,391	42	700
Navajo	76	1,653,086	21,751	22	987
Oklahoma	9	107,271	11,919	18	679
Phoenix	93	1,422,039	15,291	17	893
Portland	51	918,985	18,019	36	507
Tucson[c]	—	—	—	—	—
IHS all areas	524	$10,767,518	$20,549	21	$707

[a] Averages have been computed by area. Cases without inpatient days have been excluded from average inpatient day and average cost/day calculations.

[b] Inpatient days not available for Bemidji and Alaska.

[c] No data reported from California or Tucson.

SOURCE: U.S. Congress, Office of Technology Assessment, with data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, contract care program special data collection, fall 1984-spring 1985.

ated with an average stay of 21 days for all areas except Alaska, compared with 30 days in 1982. The average cost per day was $707 in 1983, up from $684 in 1982. The range in average costs per case was wider than in 1982: excluding average costs in Bemidji, Nashville, and Oklahoma because of incomplete reporting, the range was from $15,291 in the Portland area to $30,423 per case in Alaska.

Inpatient days were not reported by any of the areas in fiscal year 1984, and this is the year in which the greatest amount of case underreporting is suspected. Total hospital disbursements associated with the 390 cases were $8.5 million, well below the 1983 amount. Again, the small numbers of cases reported from Bemidji (no cases), Nashville, Oklahoma, California, and Tucson distort data for those IHS areas. Table 6-9 shows that in 1984 the average cost per case was nearly $22,000, ranging from about $15,000 per case in the underreported areas of Oklahoma, Nashville, and California to a high of $37,852 per case in Alaska. (Note that 1984 costs for Alaska are somewhat higher than for other areas because total expenditures, including hospital and some physician charges, were reported instead of hospital costs alone. If the average cost per case in Alaska is reduced by the approximately 16 percent nonhospital costs found in Portland, the average cost per case would be about $32,000 which, when deflated by 25 percent for the higher costs of living in Alaska to $27,000, is closer to the IHS average.)

Table 6-9.—High-Cost Cases in the IHS Contract Care Program, by Area, Fiscal Year 1984

Area	Number of cases	Total cost	Average cost/case[a]
Aberdeen	56	$ 903,835	$16,140
Alaska[b]	69	2,611,785	37,852
Albuquerque	13	232,853	17,912
Bemidji[c]	—	—	—
Billings	85	1,766,292	20,780
California[d]	1	15,232	15,232
Nashville[d]	4	58,640	14,660
Navajo	66	1,169,000	17,712
Oklahoma[d]	16	206,257	12,891
Phoenix	44	764,571	17,377
Portland	29	703,595	24,262
Tucson[d]	7	113,494	16,213
IHS all areas	390	$8,545,554	$21,912

[a] Averages have been computed by area.

[b] For the 69 cases from Alaska, reported costs include hospitalization and physician fees; in other areas, costs are for hospitalization only.

[c] No data reported from Bemidji.

[d] California, Nashville, Oklahoma, and Tucson reporting may be incomplete.

SOURCE: U.S. Congress, Office of Technology Assessment, with data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, contract care program special data collection, fall 1984-spring 1985.

Causes of the IHS High-Cost Cases

All IHS high-cost case records for fiscal years 1982, 1983, and 1984 were combined for the distribution of cases by cause presented in table 6-10. Nineteen individual cause categories are subtotaled in seven groups: complications of pregnancy, childbirth, and puerperium; infections;

Table 6-10.—High-Cost Cases in the IHS Contract Care Program, by Cause: All Cases, Fiscal Years 1982, 1983, and 1984[a]

	Fiscal years 1982-84				Fiscal years 1982-83		
Causes	Number of cases	Percent of all cases	Total costs	Average cost/case	Cases with inpatient days	Average inpatient days/case	Average cost/ inpatient day
Complications of pregnancy, childbirth, and puerperium	228	17.6	$ 6,749,106	$29,601	119	36	$ 694
1. Prematurity	167	12.9	5,489,332	32,870	76	39	696
2. Congenital anomalies	25	1.9	539,102	21,564	21	37	621
3. Neonatal complications associated with delivery	23	1.8	548,590	23,852	14	27	840
4. Maternal complications	13	1.0	172,082	13,237	8	21	662
Infections	141	10.9	2,704,798	19,133	82	27	666
5. Respiratory	59	4.6	1,214,978	20,593	31	27	767
6. Other	82	6.3	1,489,820	18,169	51	27	605
Trauma	307	23.7	6,093,984	19,850	182	29	623
7. Motor vehicle	54	4.2	991,153	18,355	34	28	703
8. Violence	36	2.8	695,830	19,329	21	23	756
9. Other trauma	174	13.4	3,322,793	19,097	109	31	587
10. Burns	38	2.9	1,009,709	26,571	15	29	594
11. Poisonings	5	0.4	74,499	14,900	3	23	569
Malignancies (12.)	64	4.9	1,412,204	22,066	32	29	662
Cardiovascular	176	13.6	3,169,621	18,009	106	16	1,087
13. Heart	138	10.7	2,517,485	18,243	83	14	1,257
14. Vascular system (emboli, aneurysms; including strokes)	38	2.9	652,136	17,161	23	24	719
Digestive system (except infections, malignancies) (15.)	125	9.7	2,176,447	17,412	75	22	750
Other	254	19.6	4,913,571	19,345	164	30	638
16. Diabetes	14	1.1	234,618	16,758	11	24	741
17. End-stage renal disease	24	1.9	389,854	16,244	19	21	826
18. Alcoholism	4	0.3	96,645	24,161	3	32	868
19. All others	212	16.4	4,192,454	19,776	131	32	609
All causes	1,295	100.0	$27,219,731	$21,019	760	28	$ 695

[a] Averages computed by cause and group of causes.

SOURCE: U.S. Congress, Office of Technology Assessment, with data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, contract care program special data collection, fall 1984-spring 1985.

trauma; malignancies; cardiovascular conditions; digestive system (other than infections and malignancies); and other. As noted above, the inconsistent and incomplete nature of available diagnosis and procedure descriptions made coding by cause difficult. The information is sufficiently important, however, to consider even within these limitations.

The distribution of cases by cause in the IHS data set tends to confirm anecdotal reports about the major causes of high-cost cases. As expected, trauma (23.7 percent of all 1,295 cases) and premature infants (12.9 percent) were among the leading causes. (Trauma descriptions often were insufficient to sort as either motor vehicle accidents or violence, but it is believed that many of the "other trauma" cases are in fact attributable to those specific causes.) Cardiovascular conditions, which included heart attacks and open heart surgery, accounted for 13.6 percent of all cases; infections also ranked relatively high, at 10.9 percent. Hospitalizations associated primarily with the treatment of malignancies, diabetes, end-stage renal disease, and alcoholism did not stand out as significant causes of high-cost care. In the case of renal patients, great efforts are made at the service unit and IHS area levels to ensure that Indian patients are enrolled in the Medicare program, if eligible, so that IHS will not be liable for this costly care (averaging at least $25,000 per dialysis patient per year). For Indians who do not qualify for Medicare coverage, Medicaid programs in most States pay for renal dialysis and transplantation.

In addition to the number and percent of all cases in each cause category, table 6-10 presents the total and average costs associated with the cases by cause. These figures include data from all 1,295 cases over 3 years. The total IHS expenditure was $27.2 million, or close to $10 million per year, and the average cost per case over the 3-year period was $21,000. Average costs per case varied by cause from a low of $13,000 to $14,000 per case for poisonings and maternal complications of pregnancy and childbirth, to a high of nearly $33,000 per case for the care of premature infants. These average costs relate to average lengths of stay by cause. Note, however, that because inpatient days were not reported for 1984 cases, the columns presenting average inpatient days per case and average cost per inpatient day by cause reflect only the 760 cases having that data item from 1982 and 1983 (Alaska excluded). Therefore, average days multiplied by average costs per day will not equal the column based on 3 years' data, average cost per case. The longest average stay by cause was 39 days for premature infants; infants with congenital anomalies also had longer than average stays, 37 days. The average length of stay for all 1982 and 1983 cases was 28 days. Maternal complications, heart conditions, some trauma, digestive system problems, diabetes, and end-stage renal disease were associated with shorter than average lengths of stay. Average costs per inpatient day, by cause, varied around $695 per day.

Because of differences in databases, it is difficult to compare the distribution of IHS high-cost contract care cases, by cause, with all IHS hospitalizations, by cause, or with other IHS health status indicators. For example, the OTA health status analysis presented in chapter 4 found that 6.1 percent of all Indian live births in all IHS areas (1980-82) were low birth weight infants. For U.S. women of all races (1981), 6.8 percent of all births were low birth weight infants (191). In 1981, the infant mortality rate among Indians (13.3 per 1,000 live births) exceeded that for the U.S. all races, 11.9 per 1,000 live births, but was lower than the infant mortality rate of 17.8 per 1,000 for nonwhite Americans (see ch. 4) (191). On the basis of these figures, it is not possible to assert that high-cost care for low birth weight infants is a substantially greater or lesser problem in IHS than in the general population.

As shown in chapter 4, the leading causes of death in Indians residing in IHS service areas (age-adjusted mortality rates) are heart disease (166.7 deaths per 100,000) and accidents (136.3 deaths per 100,000). For accidents, chronic liver disease and cirrhosis, diabetes mellitus, pneumonia and influenza, homicide, suicide, and tuberculosis, age-adjusted mortality rates for American Indians exceed rates in the general population. Complications of pregnancy, childbirth and puerperium, and injuries and poisonings are the two leading categories of hospitalization for all IHS general medical and surgical patients, direct and contract care combined (191). This is not inconsistent with the pattern of high-cost hospitalizations, but because of differences in coding, more detailed comparisons are not useful.

Table 6-11 presents the 524 high-cost cases identified for fiscal year 1983 distributed by the number and percent of cases in each IHS area, by cause category. Too much should not be made of these data because of the small numbers of cases reported by several areas, and because differences in contract care authorization policies among the areas (which relate to funding levels and the availability of direct care services) may affect the distributions by cause more than actual incidences of the conditions. No data were available in fiscal year 1983 from California or Tucson, and the small numbers of cases included from the Bemidji, Nashville, and Oklahoma IHS areas make those distributions unrepresentative. The number and distribution of high-cost cases from Albuquerque also seems atypical. Some of the variations probably are due to different medical coding habits, because "other" diagnoses categories ranged from 6.4 percent of the cases in Alaska to 32.4 percent in the Albuquerque area, while 16.4 percent of all cases were so coded throughout IHS.

Given these caveats, however, extreme variations from the overall IHS distribution by cause in individual IHS areas might indicate a need for further investigation. For example, in the Alaska area there appears to be a very high proportion of high-cost contract care cases due to complications of pregnancy and premature births, 37.2 percent of the cases, compared with 20.6 percent of the 1983 high-cost cases throughout IHS. One explanation for this high rate might be the limited obstetrical and neonatal care capabilities of Alaska bush hospitals and the high cost of transporting patients to the Anchorage Indian medical center. Inquiry to the Alaska area office revealed that al-

Table 6-11.—High-Cost Cases in the IHS Contract

Causes	IHS total		Aberdeen		Alaska		Albuquerque	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Complications of pregnancy, childbirth, and puerperium	108	20.6	16	21.6	35	37.2	2	5.9
1. Prematurity	78	14.9	9	12.2	30	31.9	1	2.9
2. Congenital anomalies	13	2.5	5	6.8	1	1.1	1	2.9
3. Neonatal complications associated with delivery	11	2.1	2	2.7	4	4.3	0	0.0
4. Maternal complications	6	1.1	0	0.0	0	0.0	0	0.0
Infections	59	11.3	14	18.9	9	9.6	2	5.9
5. Respiratory	26	5.0	5	6.8	6	6.4	1	2.9
6. Other	33	6.3	9	12.2	3	3.2	1	2.9
Trauma	131	25.0	17	23.0	21	22.3	10	29.4
7. Motor vehicle	20	3.8	2	2.7	2	2.1	4	11.8
8. Violence	14	2.7	2	2.7	2	2.1	1	2.9
9. Other trauma	78	14.9	9	12.2	10	10.6	5	14.7
10. Burns	18	3.4	4	5.4	7	7.4	0	0.0
11. Poisonings	1	0.2	0	0.0	0	0.0	0	0.0
Malignancies (12.)	30	5.7	2	2.7	10	10.6	3	8.8
Cardiovascular	63	12.0	7	9.5	7	7.4	4	11.8
13. Heart	46	8.8	1	1.4	6	6.4	3	8.8
14. Vascular system (emboli. aneurysms; including strokes)	17	3.2	6	8.1	1	1.1	1	2.9
Digestive system (except infections, malignancies) (15.)	47	9.0	5	6.8	6	6.4	2	5.9
Other	86	16.4	13	17.6	6	6.4	11	32.4
16. Diabetes	2	0.4	0	0.0	0	0.0	0	0.0
17. End-stage renal disease	11	2.1	1	1.4	0	0.0	3	8.8
18. Alcoholism	1	0.2	0	0.0	0	0.0	1	2.9
19. All others	72	13.7	12	16.2	6	6.4	7	20.6
All causes	524	100.0	74	100.0	94	100.0	34	100.0

[a] Percents are calculated on columns to show distribution of cases by cause within the areas.

[b] There were no data from California and Tucson.

[c] Data from Bemidji, Nashville, and Oklahoma may be incomplete.

SOURCE: U.S. Congress, Office of Technology Assessment, with data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, contract care program special data collection, fall 1984-spring 1985.

though field hospital limitations and consequent transportation costs were a factor, the main reason that premature infants stand out as high-cost cases in the contract care program is that the Anchorage IHS hospital is capable of providing nearly all specialty services directly, including trauma care and a level II premature nursery, but neonatal cases requiring the most intensive care in a level III nursery (usually long-term ventilator patients) must be referred out under contract care (112).

High-cost contract care cases due to infections were above the IHS average in the Aberdeen area; trauma referrals were somewhat high in Albuquerque; and in Billings, cardiovascular and digestive system high-cost cases exceeded proportions found throughout IHS. In the Navajo area, complications of pregnancy, premature births, and trauma were more frequently the causes of high-cost cases than in IHS generally. In Phoenix and Portland, on the other hand, high-cost referrals due to complications of pregnancy and prematurity were well below IHS averages. These are the types of variations that would be worth exploring in a more complete and accurate data set.

Would a $12 Million Catastrophic Fund Be Adequate?

The Indian Health Care Amendments proposed in 1984 and 1985 would have provided for a cat-

Care Program by Cause and Area, Fiscal Year 1983[a,b]

Bemidji[c]		Billings		Nashville[c]		Navajo		Oklahoma[c]		Phoenix		Portland	
Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0	0.0	16	18.0	1	50.0	19	25.0	0	0.0	15	16.1	4	7.8
0	0.0	10	11.2	1	50.0	14	18.4	0	0.0	9	9.7	4	7.8
0	0.0	3	3.4	0	0.0	2	2.6	0	0.0	1	1.1	0	0.0
0	0.0	0	0.0	0	0.0	3	3.9	0	0.0	2	2.2	0	0.0
0	0.0	3	3.4	0	0.0	0	0.0	0	0.0	3	3.2	0	0.0
0	0.0	7	7.9	0	0.0	8	10.5	0	0.0	9	9.7	10	19.6
0	0.0	2	2.2	0	0.0	4	5.3	0	0.0	5	5.4	3	5.9
0	0.0	5	5.6	0	0.0	4	5.3	0	0.0	4	4.3	7	13.7
0	0.0	20	22.5	0	0.0	23	30.3	3	33.3	24	25.8	13	25.5
0	0.0	0	0.0	0	0.0	6	7.9	0	0.0	3	3.2	3	5.9
0	0.0	4	4.5	0	0.0	0	0.0	0	0.0	3	3.2	2	3.9
0	0.0	16	18.0	0	0.0	12	15.8	2	22.2	18	19.4	6	11.8
0	0.0	0	0.0	0	0.0	5	6.6	1	11.1	0	0.0	1	2.0
0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.0
0	0.0	3	3.4	0	0.0	3	3.9	0	0.0	5	5.4	4	7.8
0	0.0	16	18.0	1	50.0	11	14.5	1	11.1	12	12.9	4	7.8
0	0.0	12	13.5	1	50.0	8	10.5	1	11.1	11	11.8	3	5.9
0	0.0	4	4.5	0	0.0	3	3.9	0	0.0	1	1.1	1	2.0
0	0.0	12	13.5	0	0.0	6	7.9	4	44.4	4	4.3	8	15.7
2	100.0	15	16.9	0	0.0	6	7.9	1	11.1	24	25.8	8	15.7
0	0.0	1	1.1	0	0.0	0	0.0	0	0.0	1	1.1	0	0.0
0	0.0	0	0.0	0	0.0	2	2.6	0	0.0	5	5.4	0	0.0
0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2	100.0	14	15.7	0	0.0	4	5.3	1	11.1	18	19.4	8	15.7
2	100.0	89	100.0	2	100.0	76	100.0	9	100.0	93	100.0	51	100.0

astrophic health emergency fund of $12 million to absorb costs to IHS service unit contract care programs exceeding a threshold of between $10,000 and $20,000 per case. The service unit would be responsible for IHS expenditures up to the threshold amount, and then could turn to the national fund for the remainder of the bill. Table 6-12 shows what the costs to such a catastrophic fund might be, by IHS area, given fiscal 1983 high-cost case experience with hospital disbursements only and thresholds set at $10,000, $15,000, and $20,000. The effects of these thresholds were calculated separately for each IHS area, because with their different average costs per case, the areas might expect varying levels of relief from the catastrophic fund. It may be noted that IHS areas that now cannot afford to purchase much inpatient contract care, such as California and perhaps Bemidji, would not benefit from the special fund because they cannot afford to spend up to the threshold figure to qualify for catastrophic fund relief.

Based on 1983 high-cost case experience, if the threshold were set at $10,000 per case, the catastrophic fund would be tapped for at least $5.5 million to cover IHS contract hospital expenditures alone. Areas with higher average costs per case, such as Alaska, could expect the most relief. If the threshold were set at $15,000, total outlays would be $3 million, minimum, and 2 of 10 IHS areas in the 1983 data set would not benefit

Table 6-12.—Hospitalization Costs to Catastrophic Fund at Various Thresholds, Fiscal Year 1983 Data

			Costs to fund if threshold at:[a]		
Area	Number of cases	Total cost	Threshold $10,000	Threshold $15,000	Threshold $20,000
Aberdeen	74	$ 1,291,481	$ 551,481	$ 181,481	$ —
Alaska	94	2,859,738	1,919,738	1,449,738	979,738
Albuquerque	34	682,911	342,911	172,911	2,911
Bemidji[b]	2	22,485	2,485	—	—
Billings	89	1,750,740	860,740	415,740	—
California[c]	—	—	—	—	—
Nashville[b]	2	58,782	38,782	28,782	18,782
Navajo	76	1,653,086	893,086	513,086	133,086
Oklahoma[b]	9	107,271	17,271	—	—
Phoenix	93	1,422,039	492,039	27,039	—
Portland	51	918,985	408,985	153,985	—
Tucson[c]	—	—	—	—	—
IHS all areas	524	$10,767,518	$5,527,518	$2,942,762	$1,134,517

[a] Costs to the catastrophic fund by area are calculated by multiplying the threshold amount by the number of cases and subtracting that result from the total cost of the cases in 1983.

[b] Reporting from Bemidji, Nashville, and Oklahoma may be incomplete.

[c] No data were reported for California or Tucson.

SOURCE: U.S. Congress, Office of Technology Assessment, with data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, contract care program special data collection, fall 1984-spring 1985.

at all. A $20,000 threshold would reduce demands on the catastrophic fund to about $1.2 million and assist only 4 of 10 areas.

The figures in table 6-12 represent IHS disbursements for hospital charges only, but in practice the catastrophic fund would cover all charges above the threshold. It is useful, therefore, to attempt to estimate the amounts of additional, nonhospital costs that would be covered by the fund. IHS data on which to base such estimates are limited. The Portland IHS area was able to provide expenditures for its recent high-cost cases broken down by billing cost center. Data for 37 cases paid out of the 1984 Portland area catastrophic contingency fund showed hospital charges to be 84 percent of total disbursements. Physician services associated with inpatient care but billed separately represented 14 percent, and all other charges to the contract care program for outpatient physician services, outpatient X-rays, drugs, supplies, and so on amounted to 2 percent of the total (198). Physician services at 14 percent of total hospital-related costs per case seem low, especially in view of data from national health expenditure studies that show physician fees at about 22 percent both of all health expenditures and of all expenditures related to inpatient care (36). The difference may result from how physician services are billed: it is likely that the services of some hospital staff physicians are included in hospital bills to the IHS contract care program (58).

Portland IHS officials have estimated physician costs associated with hospitalizations in the area's overall contract care program to be as high as 30 percent (107). IHS headquarters program statistics staff report that for the IHS contract care program in fiscal year 1984, physician fees represented about 25 percent of total contract hospital expenditures per case; and that proportion applied to the Portland area as well (58). Table 6-13 summarizes the effects of these estimates of additional nonhospital charges on the potential costs to an IHS catastrophic fund at thresholds of $10,000, $15,000, and $20,000.

It is important to note that the base figures used in table 6-13 are taken from table 6-12, which presents the effects of three cost-per-case thresholds on numbers of IHS high-cost cases identified in 1983, in 1983 dollars. For a number of reasons, the 1983 data set may not include all high-cost contract cases; and it is known that only contract hospital disbursements are reflected in the cost figures. Even with these reservations, and with the inclusion of estimated nonhospital costs ranging from 16 to 30 percent, according to the calculations in table 6-13 it appears that in 1983 a

Table 6-13.—Estimated Total Costs to the IHS Catastrophic Fund at Different Thresholds, Based on Fiscal Year 1983 Experience

Number of fiscal year 1983 cases for which IHS hospital expenditures per case exceeded $10,000: 524 cases

Total IHS hospital expenditures for the 524 cases in fiscal year 1983: $10,767,518

Estimated total IHS disbursements for 524 cases, adding physician inpatient charges	Estimated costs to fiscal year 1983 catastrophic fund for 524 cases with threshold set at:		
	$10,000	$15,000	$20,000
at 16% of total[a] = $12,818,473	$ 7,578,473	$4,958,473	$2,338,473
at 22% of total[b] = $13,804,510	$ 8,564,510	$5,944,510	$3,324,510
at 30% of total[c] = $15,382,168	$10,142,168	$7,522,168	$4,902,168

[a] Portland area data for 37 cases paid from 1984 catastrophic contingency fund: 16 percent of total IHS disbursements for those cases were for other than hospital charges, e.g., physician services to inpatients billed separately, and outpatient charges.

[b] R.M. Gibson and D.R. Waldo, "National Health Expenditures, 1981," *Health Care Financing Review* 4(1):1-35, September 1982: physician fees represent approximately 22 percent of all expenditures related to inpatient care.

[c] Portland area IHS officials estimate physician fees associated with inpatient services in the area's total contract care program at a maximum 30 percent. This high estimate is supported by IHS headquarters Program Statistics Branch staff: physician fees represent about 25 percent of total contract hospital expenditures per case throughout IHS and in the Portland area.

SOURCE: U.S. Congress, Office of Technology Assessment, with data from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, contract care program special data collection, fall 1984-spring 1985; and assumptions cited in notes, above.

$12 million catastrophic fund probably would have been adequate to meet expected demands on it, whether the threshold was set at $10,000, $15,000, or $20,000.

In a high-cost contingency fund that could become available no earlier than fiscal year 1986, however, the effects of 3 years' health cost inflation could be substantial. A threshold of $10,000 per case would include more of the total IHS contract care cases in 1986 than in 1983, based on increases in billed charges alone. With contract hospital charges inflated at private sector rates, a fund of $12 million would not go as far in 1986 as in 1983. Problems in identifying high-cost case records to make up the data sets for this analysis suggest that undercounting of cases may be considerable. There were 524 cases identified for fiscal year 1983 and, originally, 390 cases for 1984. When the 1984 billing file was searched again in October 1985, however, 746 high-cost case records were found. Such uncertainties about the numbers of high-cost cases that may be expected annually justify concerns for the adequacy of a $12 million fund. Finally, in most IHS areas (excepting perhaps Alaska and Portland), high-cost cases in tribally operated 638 contract care programs have not been included in IHS contract care program data systems. If the catastrophic fund is implemented as proposed, 638 contract care programs would be eligible to use it along with IHS-administered contract care programs. No information is available at present to estimate the numbers of additional cases that could draw on the high-cost case contingency fund from 638 contract care programs.

Managing High-Cost Cases in the IHS Contract Care Program

Although high-cost cases are known to have negative effects on the delivery of contract care in most IHS areas, at present there is no headquarters policy or program designed to help ease this problem. A headquarters level contingency fund similar to programs operating in the Alaska and Portland IHS areas apparently has been considered, but has not been implemented because of fears that it would be politically unworkable. IHS may be relying on the proposed catastrophic health emergency fund to relieve pressures on its contract care budgets. Reauthorization of the Indian Health Care Improvement Act would be necessary, however, and there still would be difficulties in establishing a system to administer such a program.

In the meantime, headquarters has developed no special policies or guidelines for the areas and service units, but has delegated responsibility for high-cost case management to those field offices. Headquarters becomes involved only if there is an extraordinarily expensive case, such as a child requiring liver transplantation for biliary atresia or an accident with multiple burn victims. Headquarters then may attempt to reprogram funds to assist in paying for such cases. Like other Federal health programs, IHS does not authorize payment for treatments judged to be experimental, i.e., liver transplants for other than biliary atresia, heart transplants, pancreas transplants, and other emerging procedures.

IHS area offices of necessity have tried to deal with the effects of high-cost cases, and they have approached the problem in a number of ways. Perhaps the most effective is the areawide catastrophic contingency fund approach. The Alaska area office has been withholding a contingency fund for many years, and 638 programs participate in the fund on the same terms as IHS-operated contract care programs. A fund of between $2 and $3 million was withheld in fiscal year 1985. The threshold was raised from $5,000 per case to $15,000 per case in mid-1984. Alaska works aggressively to collect from third-party payers as another means of reducing its contract care expenditures (8).

The same management approach is applied in the Portland IHS area, where there are no IHS direct care hospitals and all inpatient services not covered by other payers must be purchased by the contract care program. A labor-intensive manual system of monitoring costly cases has been developed there, and as noted earlier, disbursement reporting by cost center is maintained. There is general agreement among Portland area tribes that the fund has improved the situation, but pressures on contract care budgets still are extreme. Also, the contingency fund has the disadvantage that if too much is put aside for high-cost cases that do not occur, then a substantial amount of money has been withheld from service unit contract care programs, and needed services may have been denied or deferred to stay within the service unit's allocation. If the catastrophic demand is less than expected, the Portland area spends contingency funds remaining at the end of the year on lists of deferred contract care cases.

The Oklahoma City IHS area removed its contract care cap of $3,000 per case in April 1985 and instituted a catastrophic fund. The area has set aside 5.3 percent of its contract care allocation, or $600,000 in fiscal year 1985, to be available to its service units (excluding the Pawnee Benefit Package Program and 638 contract care programs). Written guidelines specify a threshold of $15,000 total costs per case, which raises the question of whether all service units would want to participate because of the requirement to spend up to the $15,000 threshold (197).

Contract care program policies for managing high-cost cases have not been studied in detail in all IHS areas. It has been reported that service units in areas without contingency funds attempt to manage their programs by monitoring expenditures closely against their quarterly budget allocations. Other factors that affect service unit costs for catastrophic care include the extent to which alternate resources (third-party payers) are available and pursued. Areas with IHS hospitals can reduce their expenditures in high-cost cases by providing care in IHS facilities before and after referral to contract providers. This is not an option in all areas, however, and the capabilities of available IHS hospitals affect the usefulness of this approach.

Conclusions

The question is, how can the IHS contract care program best manage and pay for high-cost care for its service population? If the problem is primarily one of budget management, the feasibility of implementing programs such as the contingency funds in the Alaska and Portland IHS areas might be considered for all IHS areas. Private reinsurance is not a realistic option at this time because IHS lacks adequate data to describe the extent of the problem: data on patient demographics, numbers of high-cost cases, and causes are inadequate or nonexistent. The population at risk and the numbers of high-cost cases even at the national level may be too small for private reinsurance; and most insurance plans are designed to protect individual patients from excessive costs of care, not public program budgets. Information to describe the contributions of other third-party payers in IHS contract care is completely inadequate, and this certainly would affect any plans for reinsuring the program privately.

The most feasible interim approach to easing the problem of high-cost cases in the IHS contract care program may well be something along the lines of the proposed revolving fund. It would recognize the immediate problem, budget effects, and would seek to deal with it within the program's existing budget framework through uniform national administrative policies. Such a fund would provide some relief to contract care budgets and to Indians requiring contract care in some IHS areas. In other areas, however, contract care funding already is inadequate to permit the area to spend up to the $10,000 to $20,000 threshold in order to take advantage of the contingency fund. This problem might be overcome by adjusting the threshold to reflect differences in costs of care among IHS areas.

Finally, it is not realistic to expect high-cost cases to be managed effectively in health delivery systems as small as many IHS service units. Some service units have eligible populations under 10,000 and contract care budgets of several hundred thousand dollars to pay for a year's services. The IHS policy of decentralizing responsibility for health care delivery to the service unit level, including management of contract services, is contradictory to the principle of sharing the risk for exceptionally costly cases.

There may be some question as to whether all IHS area offices have large enough contract care budgets to effectively manage high-cost cases. Some areas are attempting to make budget adjustments among their service units for these unexpected costs, with some success; but this is being done at the expense of funding for the overall contract care program. An additional fund for high-cost cases would assist some of these areas. If an acceptable formula could be developed for allocating an IHS high-cost contingency fund among the areas, it might be worth considering whether the fund would be administered more effectively at the IHS area office level than at headquarters, because the area offices are most familiar with their contract providers and with the management problems involved.

IHS DATA MANAGEMENT ISSUES

It has not been the purpose of this OTA assessment to conduct a complete and systematic evaluation of IHS management practices and information systems. Nonetheless, after a year's experience in working with a variety of IHS offices and staff (primarily at or through IHS headquarters) to obtain data for the Indian health services analysis, some general observations about IHS data systems may be made.

IHS depends on an array of uncoordinated service-specific data systems that has developed over the years in response to particular information needs. None of the IHS data systems has been designed specifically to provide consistent, reliable information for national program management and reporting requirements. IHS's delegation of many management responsibilities to its area offices has contributed to a lack of incentives to establish uniform national data systems, a situation that continues to exist in 1985. Although there has been recent recognition in IHS of the need for national data, and planning efforts to meet those needs are underway, the efforts are not near to producing results.

One example of how IHS data systems are not designed to respond to national policy and management questions relates to the proposed $12 million catastrophic health emergency fund (see the preceding section of this chapter on high-cost cases). In considering reauthorization of the Indian Health Care Improvement Act in 1984, which included the catastrophic fund, congressional committees requested data to describe the problem of high-cost cases in the IHS contract care program. IHS responded with an estimate of 400 cases annually costing $25,000 or more, anecdotal reporting of the causes, and no actual case counts by area or total. There was an ad hoc attempt at data collection late in 1984, followed by development of a detailed plan to manipulate existing IHS data files, which was not implemented. By fall 1985, OTA had obtained three different lists of fiscal year 1984 cases that reportedly had cost IHS $10,000 or more, generated from various IHS data systems and ranging in number from 390 to nearly 750 cases. Over a year after the initial congressional request, IHS still was unable to produce reliable basic descriptive data on its high-cost cases.

Many existing IHS data systems do not generate complete and consistent information for all 12 IHS areas. Some of the systems are automated, some are not; some systems are automated in certain IHS areas but not in others. Little effort has been made in the automated systems to use hardware and software that are compatible among the areas, and this has created unnecessary complications and expenses in attempting to aggregate data from the different area systems. Service-specific IHS cost data are virtually nonexistent because facilities and programs operate within annual budgets, but are not otherwise required to account for or report detailed annual operating costs.

The Patient Care Information System (PCIS) is an example of the lack of consistency among IHS area data systems. The PCIS, which is perhaps the most ambitious automated data system to be developed in IHS, has been implemented in only 3 of 12 areas (Tucson, Alaska, and Billings), reportedly because of its high implementation and operating costs. An outside consultant's evaluation of the system in 1984 found that the total cost of operating PCIS in three areas was about $2.4 million per year, or $3.00 per encounter, in comparison with $0.80 per encounter for data reporting to the Ambulatory Patient Care system that exists in other IHS areas (55). The consultants also found substantial differences in PCIS operating procedures among the three areas, including use of a different basic encounter form in Billings, and significant delays in Alaska and Billings between patient encounter and data availability compared with on-line data retrieval and flexible report generation capabilities in Tucson, the area where the system first was developed and implemented in 1975. Two points may be made in this example: first, an expensive automated patient data system was implemented without consistency in only 3 of 12 IHS areas; and second, the system was not developed by IHS headquarters to meet national program management needs, but by one of the areas (Tucson) to meet its own particular research interests.

Even in IHS data systems that are used to monitor and report on the national program (in the IHS *Chart Series Book*, for example, or in annual budget justification documents), IHS headquarters does not take an active role in defining data reporting procedures, ensuring consistency among the areas, and validating the completeness and accuracy of data reporting. Beyond the minimal computer edits that are run on some incoming records, it is IHS headquarters policy to accept data as reported by the areas. In the IHS contract care "piggyback" data system that maintains expenditures by cost center and object class, for example, flexibility is allowed to the areas in accounting the costs of services delivered under contract, but in an IHS facility, as either a direct care or contract care program cost.

Another major impediment to the generation of complete and consistent IHS data is the exemption of self-determination (638) contract programs from IHS data reporting requirements. Tribal 638 contractors may voluntarily elect to participate in existing IHS data systems, using IHS data collection forms. Such participation has not been required, however, and most 638 contractors do not operate within IHS data systems. This loss of clinical, utilization, and management data due to the nonparticipation of 638 contractors is a serious problem now and will become more serious as more services are transferred to tribal management, as is the expressed intent of the Administration and Congress. IHS recognized the need to correct this problem and issued a memorandum in November 1985 requiring uniform reporting for inpatient services, ambulatory medical services, and contract health services with standard IHS record formats from all new and renewal 638 contracts, effective immediately (50).

Currently, 20 to 30 percent of the total IHS clinical services budget is administered by the tribes under 638 contracts. Many tables in this report that present IHS data are noted to be incomplete because of the absence of data from 638 contractors. Interpretation of some data sets is further complicated by the fact that IHS area reporting gaps due to 638 contracting vary in their importance, because the level of 638 contracting by area varies considerably. Data for the California area, where most IHS services are delivered under 638 contracts, are particularly affected by this nonreporting problem. The Nashville and Bemidji IHS areas, also active in 638 contracting, are also affected. In providing data on all 12 areas, IHS generally does not attempt to correct or adjust for data gaps such as these.

OTA staff had difficulty obtaining data from IHS headquarters to describe the 638 program even in simple terms (e.g., numbers of active contracts and dollar amounts, by area). The administration of 638 contracts is viewed entirely as an area office responsibility, and therefore the collection, maintenance, and analysis of data to monitor 638 contract performance are area office functions. Information reported in the IHS *Chart Series Book* is for total IHS only, not by area; and it is not clearly indicated that in some tables "tribal contracting" includes both 638 and Buy Indian contracts (191). IHS sources have expressed reservations about the Tribal Resource and Assistance Information System data used in some *Chart Series Book* tables, because contracts are not always removed from the file when they expire, resulting in overstatement both of numbers of contracts and of dollar amounts (details of these data problems were described earlier in this chapter) (216). In late 1985, the lack of basic information on the scope of the 638 contract program led IHS to conduct a survey of all tribes to collect accurate information on active contracts, dollar amounts, 638 project staffing, and other matters. The results of that survey were not available to this study, but an interim report on the project was published in February 1986 (186).

IHS data systems are especially weak when it comes to data on the costs of providing specific health services through different IHS programs and facilities to different population groups. Because IHS must pay private providers for services authorized to IHS-eligible Indians under the contract care program, reasonably accurate data on those expenditures (not costs) by cost center and object class are maintained in the IHS contract care "piggyback" data system (part of the HRSA-PHS financial accounting system) (58). But cost accounting data relative to services delivered by IHS direct care facilities are not requested or maintained either by IHS area offices or by headquarters. As a result, IHS is unable to determine in any detail how much it costs to provide a particular package of services in a given area.

This lack of information to describe the costs of IHS direct services is an obstacle to 638 contracting, because it leaves open to dispute the amount of contract funding that should be transferred to tribal control. The lack of cost information also makes it difficult for IHS to compare the costs of directly providing a service with the costs of buying it from the private sector under contract, thus undermining the ability of program managers to make cost-effective decisions about services delivery.

IHS is not required by law or regulation to provide a uniform package of health services to eligible Indians throughout the country. Therefore, it has not been necessary to collect data nationally that could be used for national or area-specific health services planning. IHS headquarters and area offices do not plan services delivery on the basis of epidemiologic or socioeconomic data for eligible or user patient populations. Data systems such as the PCIS are designed for clinical management purposes; but they are not implemented throughout IHS, and the data they generate are not applied to services planning or administration. Data supporting the RRM system relate manpower needs to service-specific workloads. Although this type of service planning goes into preparations for new or replacement facilities construction, RRM-based estimates of resource needs do not affect budget allocations among the areas except in the small equity fund distributions. To some degree, IHS services are delivered in response to expressed demand (historical utilization patterns); but this is not the result of planning based on a population's defined health problems and needs.

It is likely that much more information could be derived from existing IHS data systems than currently is being sought and used. It appears that a great amount of data is being collected by IHS and its areas, but there is no overall framework or purpose guiding that data collection. The IHS Office of Program Statistics, for example, produces a variety of reports that could be useful to program management; but while the information may figure in the annual budget justification or in new facility plans, it is not applied systematically for program management purposes.

An assessment and coordination of existing data systems could be undertaken as an interim solution, while plans are made for implementation of a more rational and cost-effective national system. Where resources for services delivery are seen as chronically inadequate, however, as in IHS, any funds spent on data systems are likely to be viewed as better spent on direct services. When it comes to the data collection and reporting that must take place in the service units and IHS area offices, where staff may feel overworked already, resistance to additional demands and lack of time may undermine complete and accurate data reporting. Attitudes and work priorities such as these might be modified by intensive management efforts to define and demonstrate the usefulness of the information.

In times of stable or declining IHS budgets, pressures to spend every available dollar on direct service delivery will be great. The payoff for better management data will have to be found in increased program efficiency and effectiveness: getting more services for the same dollars by better management. This might require staff expertise not widely available in IHS (and which might be particularly limited in future supply under Indian preference in hiring regulations as IHS Indian manpower development funds are reduced).

IHS has acknowledged its data systems problems and is working toward improvements. Since 1980, IHS headquarters has taken a greater interest in data systems for management purposes by creating a high-level staff position for management information systems and appointing two ad hoc data system advisory committees. In spring of 1982, a new in-house group at IHS began to define and investigate the issues involved in a data systems master plan (this was the Service Unit Automation Task Group). In February 1983, a document titled "Planning for an Information Management System" was produced. Although that document was judged too abstract to serve as an implementation plan, it recommended that IHS work with General Services Administration consultants to develop the implementation plan, and that recommendation culminated in an interagency agreement with the General Services Administration in June 1983. The IHS liaison group designated to work with the General Services Administration, the IHS Information Systems Strategic Planning Task Force, produced a first iteration of the 5-year strategic information plan for implementation beginning in fiscal year 1984. The task force's review of existing IHS data systems and its approach to information management was quite critical. It found (49):

> IHS data systems were large and unwieldy, tended to collect large volumes of data with great redundancy and without clear purpose, were expensive, and most important, only partially succeeded to produce information that was useful in the field for patient care and program management, or in headquarters for policy decisions and response to concerns of higher levels of the Federal Government.

The task force proposed a plan to guide future administration of information systems in IHS. Data systems should be able to evolve to meet changing needs; information activities should relate clearly to IHS objectives; the plan should promote coordination and control of existing and new systems; and the system should be a distributed data processing framework to promote local control. Implementation of such a system would require strong top management support and clarification of relations and responsibilities between area offices and headquarters.

Late in 1985, work continued in IHS to develop detailed specifications for the outputs, hardware, and software needs of the new strategic information system, known as the Resource and Patient Management System (219). Funding for system development and operation is not assured, but the Administration's fiscal year 1987 IHS budget proposal includes $2.5 million for data system support (178).

In summary, as budgets become more constrained there will be pressures within IHS to direct all available funds to direct patient services, rather than to functions viewed as peripheral and supportive, such as data systems. The balancing of these conflicting demands will not be easy. In view of the uncertain outcome of these conflicts and of the continuing inability of IHS data systems to respond to clinical and program management information needs, much more could be done to improve and coordinate existing data systems to generate usable information for the interim. In spite of the clear need for improved IHS data capabilities, it may be overly optimistic to expect adequate funding for development and implementation of a new, state-of-the-art management information system. The question might be asked, however, at what cost are so many partially redundant data systems being maintained, and how would those costs compare with the estimated costs of implementing a new, comprehensive data system? It is likely that money could be saved by careful integration of existing systems, and that would seem to be a realistic goal for the immediate future.

Appendixes

Appendix A

American Indian and Alaska Native Population Estimates of the U.S. Census Bureau, Indian Health Service, Bureau of Indian Affairs, and Tribes

A. Aberdeen Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Iowa:				
1. Sac and Fox (non-SU)	--	658	--	--
a. Sac and Fox of the Mississippi	492	--	695	975[1]
State of Nebraska:				
1. Omaha-Winnebago SU	--	3,849	--	--
a. Omaha Tribe of Nebraska	1,275	--	1,469	3,000[1]
b. Winnebago of Nebraska	1,140	--	1,143	2,045[1]
State of North Dakota:				
1. Fort Berthold SU	--	3,037	--	--
a. Three Affiliated Tribes	2,640	--	3,194	6,055[2]
2. Fort Totten SU	--	2,681	--	--
a. Devil's Lake Sioux	2,261	--	2,916	2,187[1]
3. Fort Yates SU	--	5,528	--	--
a. Standing Rock Sioux	4,800	--	7,958	6,789[1]
4. Turtle Mountain SU (Belcourt)	--	7,744	--	--
a. Trenton-Williston (West ND)	--	--	1,214	--
b. Trenton-Williston (MT)	--	--	363	--
c. Turtle Mountain Chippewa	4,021	--	8,656	21,007[1]
State of South Dakota:				
1. Cheyenne River SU (Eagle Butte Hosp.)	--	4,801	--	--
a. Cheyenne River Sioux	1,529	--	4,449	8,500[1]
2. Pierre SU	--	3,360	--	--
a. Crow Creek Sioux	1,474	--	2,091	2,700
b. Lower Brule Sioux	850	--	988	1,405
3. Pine Ridge SU	--	14,532	--	--
a. Oglala Sioux	11,946	--	13,417	18,000[5]
	--	--	--	12,753[1]
4. Rapid City SU	--	3,637	--	--
a. Rapid City Health Board	--	--	--	--
5. Rosebud SU	--	7,455	--	--
a. Rosebud Sioux	5,688	--	9,484	15,033[2]

Aberdeen Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
6. Sisseton-Wahpeton SU	--	3,664	--	--
a. Sisseton-Wahpeton Sioux	2,700	--	4,054	6,140[1]
b. Flandreau Santee Sioux	158	--	413	576[1]
7. Yankton SU	--	2,307	--	--
a. Santee Sioux of Nebraska	420	--	434	2,000[1]
b. Yankton Sioux	1,688	--	2,531	3,600[1]
ABERDEEN AREA TOTAL	43,082	63,253	65,469	112,765

B. Alaska Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Alaska*:				
1. Anchorage SU	--	17,544	--	--
a. Aleutian-Pribilof Is. Assn.	--	--	1,889	--
b. Cook Inlet Native Assn.	--	--	10,324	--
c. Copper River Native Assn.	--	--	--	--
d. Kanaitze Indian Community	--	--	--	--
e. Northern Pacific Rim	--	--	--	--
f. Kodiak Area Native Assn.	--	--	2,477	--
2. Annette Island SU	--	981[9]	--	--
a. Metlakatla	942	--	976	--
3. Barrow SU	--	2,600	--	--
a. N. Slope Borough H.C.	--	--	--	--
4. Bristol Bay SU	--	3,688	--	--
a. Bristol Bay H.C.	--	--	4,003	--
5. Interior SU	--	6,759	--	--
a. Tanana Chiefs	--	--	6,514	--
6. Kotzebue SU	--	4,547	--	--
a. Mauneluk (Maniilaq)	--	--	4,426	--
7. Mt. Edgecumbe SU	--	9,782	--	--
a. Ketchikan Indian Corp.	--	--	--	--
b. SE Alaska Reg. H.C.	--	--	--	--
8. Norton Sound SU	--	5,174	--	--
a. Norton Sound H.C.	--	--	--	--
9. Yukon-Kuskokwim Delta SU	--	13,953	--	--
a. Yukon-Kuskokwim H.C.	--	--	--	--
ALASKA AREA TOTAL	942	64,047	30,609	--

* Census data include Indians on reservations only of which Alaska has only one.

C. Albuquerque Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of New Mexico:				
1. Acoma-Canoncito-Laguna SU	--	6,705	--	--
a. Acoma Pueblo	2,268	--	2,940	3,586[1]
b. Canoncito Navajo	969	--	--	--
c. Laguna Pueblo	3,564	--	6,406	6,406[1]
2. Albuquerque SU	--	15,358	--	--
a. Alamo Navajo	1,062	--	--	--
b. Albuquerque Service Area	--	--	--	--
c. Isleta Pueblo	2,289	--	3,110	3,224[1]
d. Jemez Pueblo	1,504	--	1,889	2,227[1]
e. Sandia Pueblo	227	--	295	316[1]
f. Santa Ana Pueblo	407	--	501	526[1]
g. Zia Pueblo	524	--	584	650[1]
3. Mescalero SU	--	2,223	--	--
a. Mescalero Apache	1,922	--	2,415	2,465[1]
4. Santa Fe SU	--	14,730	--	--
a. Cochiti Pueblo	613	--	910	954[1]
b. Jicarilla Apache	1,715	--	2,269	2,308[1]
c. Eight Northern Pueblos:	--	--	--	--
Nambe Pueblo	188	--	370	438[1]
Picuris Pueblo	125	--	177	245
Pojoaque Pueblo	94	--	78	124[1]
San Ildefonso Pueblo	488	--	430	520[1]
San Juan Pueblo	851	--	1,842	1,806[1]
Santa Clara Pueblo	1,839	--	2,327	1,374[1]
Taos Pueblo	1,034	--	1,860	1,951[1]
Tesuque Pueblo	236	--	299	312[1]
d. San Felipe Pueblo	1,789	--	2,072	2,151[1]
e. Santo Domingo Pueblo	2,139	--	3,332	2,890[1]
5. Southern Colorado SU	--	2,851[9]	--	--
a. Southern Ute	855	--	1,096	1,096[1]
b. Ute Mountain Ute	1,111	--	1,528	1,528[1]
6. Zuni-Ramah SU	--	7,594	--	--
a. Zuni Pueblo	5,988	--	6,999	6,999[1]
b. Ramah Navajo	1,163	--	--	1,696[1]
ALBUQUERQUE AREA TOTAL	34,964	46,610	43,729	45,792

D. Bemidji Program Office

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Michigan:				
1. Eastern Michigan SU	--	6,986	--	--
a. Bay Mills Chippewa	283	--	466	803[1]
b. Grand Traverse Ottawa Chippewa	--	--	834	1,165[1]
c. Saginaw Chippewa	--	--		780[1]
d. Sault Ste. Marie Chippewa	0	--	2,246	10,000[1]
2. Western Michigan SU	--	1,383	--	--
a. Keweenaw Bay Chippewa	--	--	893	2,089[1]
b. Michigan Potawatomi (Hannahville)	206	--	--	375[1]
State of Minnesota:				
1. Greater Leech Lake SU	--	4,124	--	--
a. Greater Leech Lake Chippewa	2,759	--	4,034	5,493[1]
2. Headwaters SU	--	5,180	--	--
a. Fond du Lac Chippewa	514	--	1,431	2,541[3]
b. Grand Portage Chippewa	187	--	310	724[3]
c. Mille Lac Chippewa	293	--	897	1,937[3]
d. Nett Lake Chippewa (Bois Forte)	392	--	940	1,637[3]
3. Minnesota River SU	--	729	--	--
a. Lower Sioux	65	--	209	268[1]
b. Prairie Island Sioux	80	--	118	212[1]
c. Shakopee-Mdewakanton Sioux	77	--	98	102[1]
d. Upper Sioux	51	--	127	127[1]
4. Red Lake SU	--	3,297	--	--
a. Red Lake Chippewa	2,823	--	4,399	6,027[1]
5. White Earth SU	--	3,547	--	--
a. White Earth Chippewa	2,550	--	3,948	--
State of Wisconsin:				
1. Central Wisconsin SU	--	11,393	--	--
a. Menominee	2,377	--	3,384	6,182[1]
b. Oneida	1,821	--	3,384	7,562[1]
c. Stockbridge-Munsee	582	--	948	1,106[1]
d. Wisconsin Winnebago	349	--	1,718	3,174[1]
2. N.W. Wisconsin SU	--	4,165	--	--
a. Bad River Chippewa	699	--	1,316	2,817[1]
b. Lac Courte Oreilles Chippewa	1,145	--	1,811	807[1]
c. Red Cliff Chippewa	589	--	1,349	2,137[1]
d. St. Croix Chippewa	392	--	1,041	444[3]

Bemidji Program Office

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
3. Nicolet SU	--	1,882	--	--
a. Lac du Flambeau Chippewa	1,092	--	1,485	1,590[1]
b. Sokoagan Chippewa	95	--	--	769[1]
c. Wisconsin Potawatomi	220	--	--	603[1]
AREA TOTAL	19,641	42,686	37,386	61,471

E. Billings Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Montana:				
1. Blackfeet SU	--	5,537	--	--
a. Blackfeet	5,525	--	6,632	12,033[1]
2. Crow SU	--	6,876	--	--
a. Crow	3,953	--	4,969	6,701[1]
3. Flathead SU	--	5,465	--	--
a. Confederate Salish & Kootenai	3,771	--	3,300	6,031[1]
4. Ft. Belknap SU	--	2,582	--	--
a. Gros Ventre & Assiniboine	1,870		2,097	4,000[1]
5. Ft. Peck SU	--	4,931	--	--
a. Assiniboine & Sioux	4,273		5,095	7,097[1]
6. Northern Cheyenne SU	--	3,262	--	--
a. Northern Cheyenne	3,101	--	3,110	4,889[1]
7. Rocky Boy's SU	--	2,509	--	--
a. Chippewa-Cree	1,549	--	1,897	2,900[1]
State of Wyoming:				
1. Wind River SU	--	4,546	--	--
a. Arapahoe-Shoshone	4,159	--	5,705	5,695[1]
BILLINGS AREA TOTAL	28,201	35,708	32,805	49,346

F. California Program Office

IHS Project and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of California:				
1. Auburn IHP	--	2,423	--	--
a. Shingle Springs Ra.	0	--	--	75[1]
b. Northern Sierra	--	--	--	--
2. Central Valley IHP		4,421	--	--
a. Big Sandy	--	--	129	--
b. Cold Springs Ra.	63	--	209	56[3]
c. Table Mountain	--	--	76	60[3]
d. Santa Rosa Ra.	117	--	271	209[1]
3. Clear Lake IHP (Lake County)	--	806	--	--
a. Middletown Ra.	39	--	62	35[3]
b. Robinson Ra.	--	--	68	--
c. Sulphur Bank Ra.	115	--	--	--
d. Upper Lake	--	--	133	109[3]
4. Hupa Health Assoc.	--	2,020	--	--
a. Hoopa Valley Re. (Yurok)	1,913	--	1,816	3,800[1]
5. Indian Health Council & Southern Indian Health Council				
a. Barona Ra.	222	--	301	350[1]
b. Campo Re.	86	--	205	78[1]
c. Capitan Grande Re.	0	--	--	--
d. Cuyapaipe Re.	2	--	24	6[1]
e. Inaja-Cosmit Re.	0	--	10	13[1]
f. Jamul Indian Village	--	--	62	62[1]
g. La Jolla Re.	141	--	221	420[1]
h. La Posta Re.	1	--	14	15[1]
i. Los Coyotes Re.	45	--	161	131[1]
j. Manzanita Re.	13	--	40	50[1]
k. Mesa Grande Re.	0	--	28	286[1]
l. Pala Re.	433	--	455	475[1]
m. Pauma & Yuima	86	--	93	91[1]
n. Rincon Re.	297	--	261	500[1]
o. San Pasqual Re.	133	--	347	278[1]
p. Santa Ysabel Re.	181	--	889	217[1]
q. Sycuan Re.	48	--	70	55[1]
r. Viejas Ra.	142	--	183	183[1]
6. Karok Tribal HP	--	1,485	--	--
a. Karok Tribe	--	--	--	2,000[3]
7. Consolidated Tribal HP (Mendocino)	--	1,815	--	--
a. Coyote Valley Ra.	0	--	216	--
b. Hopland Ra.	10	--	125	125
c. Laytonville Ra. (Cahto Tribe)	105	--	177	168[3]
d. Manchester/Pt. Arena	77	--	88	232[1]
e. Sherwood Valley Ra.	17	--	173	231[1]

California Program Office

IHS Project and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
8. Modoc IHP	--	238	--	--
a. Alturas Ra.	7	--	10	21[1]
b. Cedarville Ra.	6	--	16	15[1]
c. Likely Ra.	0	--	--	0
d. Lookout Ra.	12	--	11	13[3]
e. X-L Ranch Re.	24	--	54	31[1]
Pit River	--	--	--	3,000[1]
9. Northern Valley IHP	--	6,649	--	--
a. Berry Creek Ra.	0	--	154	200[1]
b. Enterprise Ra.	16	--	18	65[1]
c. Colusa	--	--	44	26[1]
d. Cachil DeHe Ra.	17	--	--	--
e. Cortina Ra.	2	--	81	87[1]
f. Grindstone Creek Ra.	72	--	173	87[1]
g. Sutter	--	--	--	--
h. Tehema	--	--	--	--
i. Rumsey Ra.	11	--	47	49[1]
10. Pi-Ma-Pa IH Consortium	--	1,000	--	--
a. Susanville Ra.	82	--	350	175[1]
b. Ft. Bidwell Re.	93	--	162	199[1]
c. Montgomery Creek Ra.	1	--	19	19[3]
d. Roaring Creek Ra.	24	--	36	36[3]
11. Riverside-San Bernardino	--	17,292	--	--
a. Agua Caliente Re.	65	--	--	218[1]
b. Augustine Re. (Cahuilla Mission)	0	--	--	0
c. Cabazon Re.	8	--	22	38[1]
d. Cahuilla Re.	29	--	148	168[1]
e. Morongo Re.	313	--	743	718[1]
f. Pechanga Re.	117	--	428	215[1]
g. Ramona Re.	0	--	3	--
Santa Rosa Re. (Cahuilla Mission)	12	--	100	46[1]
i. Soboba Re.	230	--	457	390[1]
j. Torres-Martinez Re.	11	--	81	215[1]
k. San Manuel Re.	24	--	88	40[1]
l. Twenty-nine Palms Re.	0	--	18	13[1]
12. Round Valley IHP	--	560	--	--
a. Round Valley Re.	528	--	709	2,300[1]
13. Santa Ynez IHP	--	134	--	--
a. Santa Ynez Re.	120	--	200	189[1]
14. Shasta-Trinity IHP	--	2,825	--	--
. Big Bend Ra.	8	--	106	24[3]
15. Sonoma County IHP	--	3,480	--	--
a. Dry Creek Ra.	41	--	126	127[3]
b. Stewarts Pt. Ra.	72	--	204	--

California Program Office

IHS Project and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
16. Toiyabe IHP	--	1,943	--	--
a. Big Pine Ra.	269	--	419	441[1]
b. Bishop Ra.	784	--	1,006	1,100[1]
c. Death Valley	--	--		199[1]
d. Ft. Independence Re.	31	--	93	65[1]
e. Lone Pine Ra.	172	--	204	182[1]
f. Benton Paiute Re.	12	--	25	101[3]
g. Bridgeport Paiute Colony	47	--	81	70
17. Tule River IHP	--	2,557	--	--
a. Tule River Re.	424	--	549	549[1]
18. Tuolumne Rural IHP	--	1,611	--	--
a. Jackson Ra.	15	--	19	30[3]
b. Sheep Ranch Ra.	2	--	--	1[1]
c. Tuolumne Ra.	73	--	276	102[1]
19. United IHP	--	4,946	--	--
a. Resighini Ra.	18	--	104	17[1]
b. Big Lagoon Ra.	8	--	7	--
c. Table Bluff	--	--	70	88[3]
d. Trinidad Ra.	47	--	67	125[1]
CALIFORNIA AREA TOTAL	8,133	65,757	14,435	22,104

G. Nashville Program

IHS Planning Areas and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
1. Cherokee, NC	4,844	5,604	5,664	5,971[7]
2. Chitimacha, LA	185	388	278	325
3. Choctaw, MS	2,756	4,155	4,914	4,487
4. Coushatta, LA	18	234	272	326
5. Maliseets, ME	--	--	239	299
6. Mashantucket Pequot, CT	--	--	--	--
7. Miccosukee, FL	213	1,729	457	320[1]
8. Narragansett, RI	--	--	--	1,150
9. Passamaquoddy (Indian Twnshp), ME[8]	333	1,346	367	476
10. Passamaquoddy (Pleasant Point), ME	504	--	691	698
11. Penobscot, ME	398	1,352	1,029	1,297
12. Poarch Band of Indians, AL	--	--	--	1,425
13. Seminole, FL	--	2,139	1,424	1,827
14. Seneca, NY	--	7,258	5,418	5,300
15. St. Regis, NY	1,763	2,526	2,799	3,250
16. Tunica-Biloxi, LA	7	--	--	115
NASHVILLE AREA TOTAL	11,021	26,731	23,552	27,266

H. Navajo Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
States of Arizona, New Mexico, Colorado, and Utah:				
Navajo Tribe:	104,978	145,162	--	165,000[3]
1. Chinle SU	--	20,398	--	--
2. Crownpoint SU	--	11,317	--	--
3. Ft. Defiance SU	--	20,516	--	--
4. Gallup SU	--	21,589	--	--
5. Kayenta SU	--	11,961	--	--
6. Shiprock SU	--	31,822	--	--
7. Tuba City SU	--	17,073	--	--
8. Winslow SU	--	10,486	--	--
NAVAJO AREA TOTAL	104,978	145,162	--	165,000

I. Oklahoma City Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Oklahoma:				
1. Ada SU		18,311		
a. Chickasaw	--	--	8,507	11,480[4]
b. Seminole	--	--	3,719	3,142[4]
2. Claremore SU	--	53,655	--	--
a. Eastern Shawnee	--	--	335	1,400[3]
b. Miami	--	--	350	1,900[3]
c. Modoc	--	--	150	200[3]
d. Ottawa	--	--	336	1,989[3]
e. Peoria	--	--	355	2,050[3]
f. Quapaw	--	--	1,193	2,900[3]
g. Seneca-Cayuga	--	--	670	3,100[3]
h. Wyandotte	--	--	440	2,400[3]
3. Clinton SU	--	5,960	--	--
a. Cheyenne Arapaho Tribes	--	--	--	7,677[1]
4. Haskell SU	--	--	--	--
a. Haskell Indian School & Hlth Ctr	--	--	--	--
5. Kansas (Holton) SU	--	3,172	--	--
a. Iowa of Kansas & Nebraska	--	--	280	2,118[1]
b. Kickapoo of Kansas	--	--	598	1,198[1]
c. Prairie Band of Potowatomi	--	--	1,302	3,289[1]
d. Sac & Fox of Missouri	--	--	36	243[1]
6. Lawton SU	--	13,996	--	--
a. Apache	--	--	517	833[1]
b. Caddo	--	--	1,215	2,031[1]
c. Comanche	--	--	3,597	7,413[1]

Oklahoma City Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
d. Delaware-Western	--	--	522	955[1]
e. Ft. Sill Apache	--	--	70	272[1]
f. Kiowa	--	--	4,005	7,948[1]
g. Wichita	--	--	610	996[1]
7. Pawnee SU	--	11,406	--	--
a. Pawnee	--		2,066	2,500[5]
	--	--	--	2,249[1]
b. Kaw	--	--	617	781[1]
c. Tonkawa	--	--	1,265	182[1]
d. Osage	4,749	--	5,612	10,000[3]
e. Otoe-Missouri	--	--	1,165	1,450[1]
f. Ponca	--	--	2,065	2,022[1]
8. Shawnee SU	--	23,616	--	--
a. Absentee Shawnee	--	--	1,365	1,971[1]
b. Citizens Band of Potawatomi	--	--	6,354	11,071[1]
c. Iowa of Oklahoma	--	--	203	286[1]
d. Kickapoo of Eagle Pass (Texas)	--	--	--	--
e. Kickapoo of Oklahoma	--	--	715	1,528[1]
f. Sac & Fox of Oklahoma	--	--	1,352	2,145[1]
9. Tahlequah SU	--	26,101	--	--
a. Cherokee Nation of Oklahoma	--	--	42,992	43,512[4]
b. Creek	--	--	37,679	18,867[4]
10. Talihina SU	--	16,419	--	--
a. Choctaw	--	--	19,660	28,022[1]
OKLAHOMA CITY AREA TOTAL	4,749	172,636	151,917	192,120

J. Phoenix Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Arizona:				
1. Colorado River SU	--	4,306	--	--
a. Chemehuevi	23	--	124	316[6]
b. Colorado River	1,965	--	2,084	2,300[6]
c. Ft. Mojave	127	--	537	640[1]
d. Havasupai	267	--	475	475[1]
e. Hualapai	809	--	1,017	1,133[6]
2. Ft. Yuma SU	--	2,242	--	--
a. Cocopah	349	--	835	475[6]
b. Quechan (Ft. Yuma	1,105	--	1,500	1,875[1]
c. Riverside School	--	--	--	--

Phoenix Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
3. Keams Canyon SU	--	4,129	--	--
a. Hopi	6,591	--	8,439	6,667[1]
b. Kiabab/Paiute	93	--	229	139[1]
4. Phoenix SU	--	22,259	--	--
a. Campe Vere	173	--	516	--
b. Ft. McDowell	345	--	383	452[6]
c. Gila Bend	--	--	760	
d. Gila River (pop. split with Sacaton SU)*	--	--	9,592	8,310[1]
e. Payson Apache	--	--	66	--
f. Salt River	2,624	--	3,364	4,109[5]
	--	--	--	3,313[1]
g. Yavapai-Prescott	66	--	--	150[1]
Yavapai-Apache	--	--	--	951[1]
h. Phoenix Indian School	--	--	--	--
i. Phoenix Service Area	--	--	--	--
5. Sacaton SU	--	8,996	--	--
a. Ak Chin	--	--	433	423[1]
b. Gila River (pop. split with Phoenix SU)*	7,067	--	9,592	8,310[1]
6. San Carlos SU	--	7,186	--	--
a. San Carlos Apache	5,872	--	5,967	8,500[1]
7. Whiteriver SU	--	7,903	--	--
a. White Mountain Apache	6,880	--	8,010	7,700[1]
State of Nevada:				
1. Owyhee SU	--	2,358	--	--
a. Battle Mountain	--	--	196	175[1]
b. Duck Valley (Shoshone-Paiute)	932	--	--	1,200[1]
c. Duck Water	103	--	139	150[1]
d. Elko	--	--	468	395[6]
e. Ely	67	--	234	160[1]
f. Goshute	105	--	211	200[1]
g. Ruby Valley	--	--	--	--
h. South Fork	--	--	123	119[1]
i. Te-Moak	91	--	--	500[1]
2. Schurz SU	--	11,586	--	--
a. Fallon Colony	304	--	677	1,200[1]
b. Ft. McDermitt	463	--	653	529[1]
c. Las Vegas	106	--	123	105[1]
d. Lovelock Paiute	117	--	163	163[1]
e. Moapa Paiute	182	--	216	380[1]
f. Pyramid Lake	720	--	776	1,120[1]
g. Reno Sparks	451	--	603	507[1]
h. Summit Lake	15	--	--	66[1]

Phoenix Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
i. Walker River	471	--	980	1,100[1]
j. Washoe	4	--	544	1,800[1]
Carson	213	--	--	129[1]
Dresslerville	127	--	--	153[1]
Woodfords	126	--	--	250[1]
k. Winnemucca	35	--	81	30[1]
l. Yerington	105	--	342	363[1]
m. Yomba	57	--	114	95[1]
State of Utah:				
1. Uintah & Ouray SU	--	3,055	--	--
a. Uintah & Ouray Ute	2,050	--	1,890	1,720[1]
b. Paiutes of Utah (Southern Paiute)	186	--	312	543[1]
c. Skull Valley	13	--	72	61[1]
PHOENIX AREA TOTAL	41,399	74,020	62,840	69,451

K. Portland Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Idaho:				
1. Fort Hall SU	--	3,685	--	3,100[1]
a. Shoshone-Bannock	2,542	--	3,820	--
2. N. Idaho SU	--	7,538	--	--
a. Coeur d'Alene	538	--	822	1,200[1]
b. Kootenai	40	--	115	65[1]
c. Nez Perce	1,463	--	2,020	2,560[1]
State of Oregon:				
1. Umatilla SU	--	1,670	--	--
a. Umatilla Tribe	908	--	1,500	1,342[1]
2. Warm Springs SU	--	4,052	--	--
a. Burns Paiute	160	--	194	205[1]
b. Warm Springs	2,004	--	2,412	2,400[1]
3. Western Oregon SU	--	7,268	--	--
a. Chemawa	--	--	--	--
b. Cow Creek Umpqua	--	--	--	700[3]
c. Grande Ronde	--	--	--	1,100
d. Siletz	--	--	671	1,550[1]
e. Coos-Umpqua-Siuslaw	--	--	--	800[3]

Portland Area

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Washington:				
1. Colville SU	--	5,175	--	--
a. Colville Tribe	3,500	--	6,090	6,240[1]
2. Neah Bay SU	--	2,113	--	--
a. Jamestown	--	--	323	150[3]
b. Lower Elwha	47	--	1,191	403[1]
c. Makah	803	--	927	1,789[3]
d. Quileute	273	--	327	546[1]
3. NW Washington SU	--	4,390	--	--
a. Lummi	1,259	--	2,290	1,225[1]
b. Nooksack	0	--	694	425[1]
c. Swinomish	414	--	648	495[1]
d. Upper Skagit	0	--	376	215[1]
4. Puget Sound SU	--	27,251	--	--
a. Muckleshoot	375	--	2,227	408[1]
b. Nisqually	42	--	1,257	175[1]
c. Puyallup	856	--	5,660	1,200[1]
d. Port Gamble (Clallam)	266	--	446	479[1]
e. Sauk Suiattle	0	--	255	220[1]
f. Skokomish	305	--	1,008	501[1]
g. Squaxin Island	35	--	926	290[1]
h. Stillaguamish	--	--	464	153[1]
i. Suquamish (Port Madison)	148	--	1,784	583[1]
j. Tulalip	768	--	855	950[1]
5. Wellpinit SU				
a. Spokane (inc. Kalispel until FY 83)	1,050	1,831	1,921	1,938[1]
b. Kalispel	98	--	205	185[1]
6. Taholah SU	--	3,090	--	--
a. Chehalis	200	--	721	377[1]
b. Hoh	46	--	61	101[1]
c. Quinault	943	--	2,013	1,800[1]
d. Shoalwater Bay	28	--	62	101[1]
7. Yakima SU	--	7,706	--	--
a. Yakima Tribe	4,983	--	8,502	6,775[1]
PORTLAND AREA TOTAL	24,094	75,769	52,787	42,746

L. Tucson Program Office

IHS Service Unit and Tribe	1980 Census	1980 IHS Service Pop.	1980 BIA Resident Pop.	Tribal
State of Arizona:				
1. Sells SU	--	15,109	--	--
Papago Tribe	6,959	--	10,610	16,530[1]
2. Total Contract SU	--	1,121	--	--
Pascua-Yaqui	551	--	616	7,000[1]
TUCSON AREA TOTAL	7,510	16,230	11,226	23,530
ALL IHS AREAS TOTAL	328,714	828,609	526,755	811,591

1980 Census figures include American Indians living on reservations only.

[1] Enrolled population as of 12/81
[2] 1978 payment rolls
[3] BIA estimate considered "rough"
[4] 1906 Final Roll
[5] Reported at an OTA regional meeting, 1985
[6] Tribal Membership
[7] Estimated service unit population
[8] IHS service population figure combines Indian Township and Pleasant Point groups of the Passamaquoddy.
[9] IHS service population, 1981

SOURCES: U.S. Bureau of the Census, PC80-S1-13, 1984; U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Population Statistics Staff; Bureau of Indian Affairs, Local Estimates of Resident Indian Population and Labor Force Status, December 1981, Jan. 1982; and approximate enrollment figures from an unpublished BIA document, 1981.

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALL AREAS (EXCLUDING CALIFORNIA) BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	15321	652.8	471.3	43.1	285.5	397.1	555.4	950.5	1694.8	3081.5	6097.0	13325.2	778.3	1.4
310	DISEASE OF HEART	3058	130.3	14.5	0.9	5.3	15.2	55.9	172.6	454.2	1024.2	2064.3	4363.7	166.7	0.9
350	..ISCHMC HRT DIS	1956	83.3	0.4	.	0.4	6.3	28.8	114.6	311.8	736.7	1334.5	2481.9	109.3	0.8
360	....ACUT MYO INF	1212	51.6	.	.	0.4	3.3	19.5	80.1	210.8	492.4	773.4	1047.7	69.8	0.9
390	....OLD MI,OTHER	692	29.5	0.4	.	.	2.8	8.9	31.0	89.5	225.2	535.0	1383.4	36.6	0.6
370	....OTH ACUT IHD	49	2.1	.	.	.	0.3	0.4	3.5	11.4	19.1	23.3	30.5	2.8	2.2
380	....ANGINA PECTO	3	0.1	.	.	.	.	.	.	.	.	2.9	20.3	0.1	1.1
410	..ALL OTH HRT DS	932	39.7	13.7	0.8	3.0	5.8	22.4	48.6	115.6	245.6	610.6	1749.6	48.1	1.2
320	..RHEUM FEVER	60	2.6	0.4	0.2	1.5	1.9	3.0	4.7	12.2	12.7	8.7	.	3.4	1.5
330	..HYPRTNS HRT DS	55	2.3	.	.	.	0.3	0.8	2.3	8.1	19.1	61.1	20.3	3.1	0.5
400	..OTH ENDOCRD DS	44	1.9	.	.	0.4	0.8	0.8	1.8	6.5	8.9	34.9	71.2	2.3	1.1
340	..HYPRTNS+RENAL	11	0.5	.	.	.	.	.	0.6	.	1.3	14.5	40.7	0.5	0.6
790	ACCIDENTS/ADVERS	2946	125.5	63.5	26.1	164.2	181.9	159.2	159.7	170.1	170.5	209.3	356.0	136.3	3.4
800	..MOTOR VEHICLE	1669	71.1	25.6	11.3	114.3	107.9	87.6	80.7	81.4	72.5	81.4	71.2	75.6	3.5
810	..ALL OTH ACCDNT	1277	54.4	37.9	14.7	49.9	74.0	71.5	79.0	88.7	98.0	127.9	284.8	60.7	3.4
150	MALIG NEOPLASMS	1713	73.0	2.6	1.9	5.6	10.5	37.3	129.9	302.8	606.9	1023.4	1190.1	98.4	0.7
170	..MAL NEO-DIGEST	548	23.3	.	.	0.6	2.2	10.2	42.7	91.2	198.5	369.3	457.7	31.5	1.0
180	..MAL NEO-RESPIR	343	14.6	0.4	.	0.2	0.3	3.4	26.3	84.7	143.8	162.8	142.4	20.7	0.6
220	..MAL NEO-OTHER	262	11.2	0.7	0.8	1.9	3.3	6.8	14.6	31.7	95.4	177.4	183.1	14.5	0.9
200	..MAL NEO-GENITL	215	9.2	.	.	0.9	1.4	6.8	14.6	29.3	64.9	159.9	223.8	11.9	0.9
190	..MAL NEO-BREAST	90	3.8	.	.	.	0.3	4.2	15.8	22.0	20.4	11.6	50.9	5.6	0.4
210	..MAL NEO-URINAR	80	3.4	0.4	.	.	1.4	0.8	7.0	17.9	29.3	32.0	40.7	4.7	0.9
240	..OTH NEOP LYMPH	79	3.4	0.4	.	0.2	0.3	1.7	4.1	10.6	36.9	49.4	61.0	4.5	0.7
230	..LEUKEMIA	62	2.6	0.7	1.1	1.9	1.4	2.5	2.3	8.1	7.6	29.1	30.5	3.1	0.6
160	..MAL NEOPLS-LIP	34	1.4	.	.	.	.	0.8	2.3	7.3	10.2	32.0	.	2.0	0.7
620	LIVER DIS/CIRRHS	801	34.1	0.4	.	1.7	34.8	95.2	128.1	109.1	82.7	55.2	30.5	48.1	4.2
430	CEREBROVASC DS	664	28.3	1.5	.	0.8	3.6	10.6	26.3	72.4	171.8	575.7	1536.0	33.8	0.9
470	..ALL OTH CBV DS	473	20.2	.	.	0.2	1.9	7.2	12.9	45.6	122.1	441.9	1241.0	23.5	0.9
440	..INTRCRB HMRHG	113	4.8	0.7	.	0.4	1.1	3.4	11.7	21.2	26.7	58.1	101.7	6.4	1.1
450	..CERBRL THROMB	76	3.2	0.7	.	0.2	0.3	.	1.8	5.7	22.9	72.7	193.3	3.7	0.6
460	..CEREBRL EMBOL	2	0.1	.	.	.	0.3	.	.	.	.	2.9	.	0.1	0.5
510	PNEUMONIA/INFLNZ	580	24.7	19.3	1.5	2.1	5.0	9.7	23.4	38.3	100.5	407.0	1647.8	26.6	2.2
[illegible]	..PNEUMONIA	556	23.7	18.9	1.5	1.9	5.0	9.7	22.2	37.4	96.7	383.8	1566.5	25.6	2.2
530	..INFLUENZA	24	1.0	0.4	.	0.2	.	.	1.2	0.8	3.8	23.3	81.4	1.1	1.8
260	DIABETES MELLITU	470	20.0	0.4	.	0.2	3.9	8.0	31.6	107.5	178.1	258.8	203.4	27.8	2.8

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

SOURCES: Indian data: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, computer tape supplied to the Office of Technology Assessment, Washington, DC, 1985. U.S. data: U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Advance Report-Final Mortality Statistics, 1981," Monthly Vital Statistics Report 33(3):supp., June 22, 1984.

Deaths, Age-Specific and Age-adjusted Death Rates, All Areas Both Sexes (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
830	HOMICIDE	458	19.5	5.9	1.9	28.5	33.7	31.3	30.4	17.1	8.9	.	10.2	21.2	2.0
820	SUICIDE	447	19.0	.	0.8	39.2	37.3	23.7	14.0	9.0	8.9	2.9	.	19.4	1.7
740	PERINATAL CONDIT	331	14.1	121.7	0.2	.	.	.	.	.	.	.	.	9.8	1.1
760	..OTH COND PERIN	217	9.2	79.4	0.2	.	.	.	.	.	.	.	.	6.4	1.0
750	..BIRTH TRAUMA	114	4.9	42.3	.	.	.	.	.	.	.	.	.	3.4	1.2
640	NEPHRITIS, ET AL	229	9.8	1.1	.	1.3	3.0	6.8	14.0	33.4	68.7	125.0	305.2	12.4	2.8
670	..RENAL FAIL,ETC	199	8.5	1.1	.	0.8	2.2	5.9	9.4	30.1	58.5	119.2	305.2	10.7	2.8
660	..CHRN GLMR/NEPH	30	1.3	.	.	0.6	0.8	0.8	4.7	3.3	10.2	5.8	.	1.8	3.5
730	CONGEN ANOMALIES	205	8.7	66.8	0.4	1.3	1.1	1.3	1.2	2.4	2.5	2.9	10.2	6.5	1.1
540	CHRON PULMON DIS	177	7.5	0.7	.	0.8	0.3	0.4	8.8	24.4	62.3	157.0	213.6	9.6	0.6
580	..OTH CHRN PULMO	133	5.7	.	.	0.4	.	0.4	4.7	17.9	50.9	122.1	183.1	7.2	0.7
560	..EMPHYSEMA	17	0.7	.	.	0.2	.	.	1.8	2.4	6.4	11.6	10.2	1.0	0.3
570	..ASTHMA	14	0.6	.	.	0.2	0.3	.	0.6	3.3	1.3	11.6	20.3	0.7	0.7
550	..BRONCH,CHRON	13	0.6	0.7	.	.	.	.	1.8	0.8	3.8	11.6	.	0.7	0.7
090	SEPTICEMIA	122	5.2	5.9	.	0.4	0.3	3.4	5.8	21.2	36.9	52.3	122.1	6.5	2.2
030	TUBERCULOSIS	77	3.3	0.4	.	0.2	0.3	3.4	6.4	9.8	16.5	58.1	101.7	4.2	7.0
040	..TB-RESPIRATORY	56	2.4	.	.	0.2	0.3	1.7	4.1	8.1	10.2	49.4	81.4	3.0	6.0
050	..OTHER TB	21	0.9	0.4	.	.	.	1.7	2.3	1.6	6.4	8.7	20.3	1.2	11.9
480	ATHEROSCLEROSIS	75	3.2	.	.	.	.	0.4	1.2	6.5	17.8	37.8	376.4	3.3	0.6
140	ALL OTH INF/PARA	63	2.7	3.7	0.6	0.6	0.8	1.3	5.3	9.0	8.9	32.0	30.5	3.2	2.1
490	OTHER ARTERY DIS	62	2.6	.	.	0.4	1.1	0.4	4.1	9.8	19.1	40.7	71.2	3.4	0.6
630	CHOLEL/GALLBLDR	58	2.5	.	.	0.4	.	0.4	1.8	5.7	19.1	58.1	101.7	3.0	4.3
290	MENINGITIS	44	1.9	9.3	.	0.2	0.3	2.1	1.2	2.4	2.5	11.6	10.2	1.8	3.6
420	..HYPRTNS+/- RNL	40	1.7	.	.	0.2		1.3	4.1	9.0	8.9	17.4	50.9	2.3	1.2
590	ULCER-STOM,DOOD	37	1.6	.	0.2	.	.	0.8	5.8	9.0	6.4	17.4	20.3	2.2	1.3
250	BENIGN NEO,OTHER	34	1.4	1.1	.	0.6	.	0.8	1.2	5.7	11.5	11.6	40.7	1.8	0.9
610	HERNIA/INTST.OBS	34	1.4	0.4	.	0.2	0.3	.	1.2	3.3	6.4	34.9	81.4	1.6	1.3
270	NUTRITION DEFICS	29	1.2	0.4	0.2	.	.	.	0.6	0.8	3.8	23.3	142.4	1.2	2.4
680	KIDNEY INFECTION	24	1.0	0.4	.	0.2	0.3	.	2.9	1.6	6.4	20.4	20.3	1.3	2.6
280	ANEMIAS	11	0.5	0.4	.	0.2	.	0.4	.	1.6	1.3	8.7	20.3	0.5	0.6
500	ACUTE BRONCHITIS	10	0.4	3.0	.	.	.	.	.	0.8	1.3	.	.	0.4	1.8
120	VIRAL HEPATITIS	9	0.4	0.7	.	.	0.6	0.4	2.3	.	.	.	.	0.5	1.6
080	MENINGOCOCCL INF	8	0.3	2.2	.	.	.	.	.	1.6	.	.	.	0.3	1.5
690	PROSTATE HYPERPL	7	0.3	.	.	.	.	.	.	1.6	.	5.8	30.5	0.3	3.2
020	OTH INTSTNL INFS	6	0.3	2.2	.	.	.	.	.	.	.	.	.	0.2	1.8
600	APPENDICITIS	5	0.2	.	.	.	.	.	0.6	1.6	1.3	2.9	.	0.3	1.6
700	PREGNANCY COMPLI	5	0.2	.	.	0.2	0.6	0.8	.	.	.	.	.	0.2	2.4
720	..OTH PREG COMPL	5	0.2	.	.	0.2	0.6	0.8	.	.	.	.	.	0.2	2.4
010	SHIGELL/AMEBIASI	3	0.1	0.4	.	.	.	.	.	0.8	.	.	10.2	0.1	.
130	SYPHILIS	1	0.0	.	.	0.2	.	.	.	.	.	.	.	0.0	.
770	SYMP/SIGN/ILL-DF	817	34.8	96.9	3.2	8.8	13.2	12.3	26.9	67.6	131.0	264.6	905.3	35.8	3.7
840	ALL OTH EXTRNL C	133	5.7	2.2	0.2	7.5	9.1	7.2	8.8	9.0	10.2	5.8	.	6.4	4.3
780	ALL OTHER DISEAS	1528	65.1	43.4	5.1	14.6	40.3	80.4	130.4	175.8	286.3	511.7	1322.3	80.6	2.3

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALL AREAS (EXCLUDING CALIFORNIA) FEMALE

			CRUDE RATE	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	5994	503.4	418.8	30.2	142.2	229.9	357.1	688.8	1252.4	2410.8	5072.9	11773.8	578.6	1.4
310	DISEASE OF HEART	1234	103.6	14.3	1.1	5.6	9.2	23.8	95.2	286.7	748.1	1718.7	3964.5	121.5	0.9
350	..ISCHMC HRT DIS	731	61.4	0.8	.	.	3.8	7.4	48.2	165.8	511.2	1062.5	2426.5	72.6	0.8
360	....ACUT MYO INF	421	35.4	.	.	.	1.6	6.6	33.6	114.7	328.3	567.7	974.0	43.6	0.9
390	....OLD MI,OTHER	293	24.6	0.8	.	.	1.6	0.8	14.6	43.4	175.9	468.7	1401.2	27.3	0.6
370	....OTH ACUT IHD	15	1.3	.	.	.	0.5	.	.	7.7	7.0	20.8	34.2	1.5	1.9
380	....ANGINA PECTO	2	0.2	.	.	.	.	.	.	.	.	5.2	17.1	0.2	1.5
410	..ALL OTH HRT DS	408	34.3	12.8	0.8	3.4	3.2	12.3	35.8	93.0	206.4	510.4	1384.1	39.4	1.3
320	..RHEUM FEVER	35	2.9	0.8	0.4	1.5	1.6	3.3	5.6	15.5	11.7	10.4	.	3.8	1.4
330	..HYPRTNS HRT DS	28	2.4	.	.	.	0.5	.	2.2	6.2	14.1	67.7	34.2	2.9	0.6
400	..OTH ENDOCRD DS	23	1.9	.	.	0.7	.	0.8	2.2	6.2	4.7	41.7	68.4	2.2	1.4
340	..HYPRTNS+RENAL	9	0.8	.	.	.	.	.	1.1	.	.	26.0	51.3	0.8	1.1
150	MALIG NEOPLASMS	827	69.5	3.8	1.9	5.6	9.2	42.7	133.3	277.4	501.9	833.3	1042.4	89.4	0.8
170	..MAL NEO-DIGEST	255	21.4	.	.	0.7	1.1	11.5	32.5	75.9	182.9	322.9	324.7	27.5	1.1
220	..MAL NEO-OTHER	145	12.2	1.5	0.8	1.1	3.8	4.1	17.9	37.2	98.5	171.9	188.0	15.2	1.1
200	..MAL NEO-GENITL	130	10.9	.	.	1.1	2.7	12.3	23.5	37.2	53.9	135.4	222.1	13.8	1.0
180	..MAL NEO-RESPIR	102	8.6	.	.	.	.	2.5	13.4	54.2	77.4	72.9	85.4	11.5	0.6
190	..MAL NEO-BREAST	90	7.6	.	.	.	0.5	8.2	30.2	41.8	37.5	20.8	85.4	10.5	0.5
240	..OTH NEOP LYMPH	37	3.1	0.8	.	.	.	1.6	6.7	6.2	30.5	36.5	68.4	3.9	0.7
230	..LEUKEMIA	30	2.5	0.8	1.1	2.6	0.5	1.6	3.4	9.3	2.3	20.8	34.2	2.8	0.7
210	..MAL NEO-URINAR	25	2.1	0.8	.	.	0.5	0.8	3.4	10.8	11.7	26.0	34.2	2.7	0.9
160	..MAL NEOPLS-LIP	13	1.1	.	.	.	.	.	2.2	4.6	7.0	26.0	.	1.4	1.0
790	ACCIDENTS/ADVERS	781	65.6	54.9	18.7	79.7	92.1	73.1	81.8	69.7	75.0	119.8	222.1	69.0	3.4
800	..MOTOR VEHICLE	510	42.8	24.8	9.6	67.0	66.2	47.6	45.9	41.8	30.5	46.9	34.2	44.5	3.9
810	..ALL OTH ACCDNT	271	22.8	30.1	9.2	12.7	25.8	25.5	35.8	27.9	44.6	72.9	188.0	24.5	2.7
620	LIVER DIS/CIRRHS	351	29.5	0.8	.	1.9	29.1	76.4	107.5	86.8	77.4	67.7	.	40.1	5.4
430	CEREBROVASC DS	334	28.1	0.8	.	0.4	4.8	13.1	24.6	58.9	147.7	468.7	1606.3	31.3	0.9
470	..ALL OTH CBV DS	251	21.1	.	.	0.4	2.7	9.9	12.3	37.2	119.6	364.6	1315.8	23.0	1.0
440	..INTRCRB HMRHG	49	4.1	0.8	.	.	1.6	3.3	11.2	15.5	18.8	36.5	102.5	5.2	0.9
450	..CERBRL THROMB	33	2.8	.	.	.	.	.	1.1	6.2	9.4	67.7	188.0	2.9	0.5
460	..CEREBRL EMBOL	1	0.1	.	.	.	0.5	.	.	.	.	.	.	0.1	0.4
260	DIABETES MELLITU	261	21.9	.	.	.	2.2	4.9	28.0	116.2	190.0	291.7	239.2	28.8	3.0
510	PNEUMONIA/INFLNZ	241	20.2	19.5	0.8	1.1	2.2	6.6	16.8	24.8	82.1	343.7	1127.8	21.0	2.3
520	..PNEUMONIA	228	19.1	19.5	0.8	1.1	2.2	6.6	14.6	23.2	77.4	317.7	1076.6	19.8	2.3
530	..INFLUENZA	13	1.1	.	.	.	.	.	2.2	1.5	4.7	26.0	51.3	1.3	2.1
740	PERINATAL CONDIT	127	10.7	95.5	.	.	.	.	.	.	.	.	.	7.5	0.8
760	..OTH COND PERIN	88	7.4	66.2	.	.	.	.	.	.	.	.	.	5.2	0.9
750	..BIRTH TRAUMA	39	3.3	29.3	.	.	.	.	.	.	.	.	.	2.3	1.0
640	NEPHRITIS, ET AL	125	10.5	1.5	.	1.5	1.6	6.6	14.6	38.7	65.7	130.2	290.5	12.8	3.6

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, All Areas Females (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
830	HOMICIDE	125	10.5	6.8	1.1	10.9	18.8	20.5	17.9	9.3	4.7	.	.	11.7	2.7
670	..RENAL FAIL,ETC	110	9.2	1.5	.	0.7	0.5	5.7	12.3	34.1	56.3	125.0	290.5	11.2	3.6
660	..CHRN GLMR/NEPH	15	1.3	.	.	0.7	1.1	0.8	2.2	4.6	9.4	5.2	.	1.6	3.2
730	CONGEN ANOMALIES	102	8.6	68.4	0.4	0.4	1.1	0.8	2.2	3.1	2.3	5.2	.	6.5	1.2
820	SUICIDE	66	5.5	.	0.4	12.3	12.4	5.7	2.2	.	.	.	.	5.4	1.0
090	SEPTICEMIA	65	5.5	5.3	.	0.4	.	3.3	7.8	21.7	25.8	67.7	136.7	6.5	2.7
540	CHRON PULMON DIS	54	4.5	.	.	0.4	0.5	0.8	4.5	13.9	37.5	88.5	85.4	5.6	0.6
580	..OTH CHRN PULMO	40	3.4	.	.	.	.	0.8	3.4	9.3	25.8	78.1	68.4	4.1	0.7
570	..ASTHMA	7	0.6	.	.	0.4	0.5	.	.	1.5	2.3	10.4	17.1	0.6	0.6
560	..EMPHYSEMA	5	0.4	.	.	.	.	.	1.1	3.1	4.7	.	.	0.6	0.3
550	..BRONCH,CHRON	2	0.2	.	.	.	.	.	.	.	4.7	.	.	0.2	0.4
480	ATHEROSCLEROSIS	43	3.6	.	.	.	.	0.8	.	6.2	16.4	41.7	393.0	3.5	0.8
030	TUBERCULOSIS	34	2.9	.	.	.	.	2.5	6.7	9.3	16.4	46.9	51.3	3.7	9.2
040	..TB-RESPIRATORY	23	1.9	.	.	.	.	0.8	3.4	7.7	9.4	41.7	34.2	2.4	8.1
050	..OTHER TB	11	0.9	.	.	.	.	1.6	3.4	1.5	7.0	5.2	17.1	1.2	12.3
630	CHOLEL/GALLBLDR	29	2.4	.	.	0.7	.	.	1.1	3.1	23.5	46.9	85.4	2.8	4.0
140	ALL OTH INF/PARA	23	2.1	3.8	0.4	0.7	0.5	.	5.6	4.6	4.7	31.2	.	2.4	1.8
490	OTHER ARTERY DIS	25	2.1	.	.	0.4	0.5	0.8	3.4	7.7	9.4	20.8	102.5	2.4	0.8
290	MENINGITIS	19	1.6	8.3	.	.	.	0.8	1.1	1.5	2.3	15.6	17.1	1.5	3.7
420	..HYPRTNS+/- RNL	19	1.6	.	.	.	.	0.8	3.4	3.1	11.7	15.6	85.4	1.9	1.1
250	BENIGN NEO,OTHER	18	1.5	0.8	.	0.7	.	0.8	2.2	3.1	11.7	10.4	51.3	1.7	1.0
610	HERNIA/INTST.OBS	17	1.4	0.8	.	.	0.5	.	.	3.1	2.3	31.2	102.5	1.4	1.1
680	KIDNEY INFECTION	17	1.4	0.8	.	0.4	.	.	3.4	1.5	9.4	26.0	34.2	1.7	2.8
590	ULCER-STOM,DUOD	15	1.3	.	.	.	.	.	3.4	9.3	7.0	15.6	.	1.7	1.5
270	NUTRITION DEFICS	14	1.2	0.8	.	.	.	.	1.1	1.5	.	15.6	136.7	1.0	2.6
280	ANEMIAS	5	0.4	0.8	.	.	.	.	.	.	.	10.4	34.2	0.4	0.5
700	PREGNANCY COMPLI	5	0.4	.	.	0.4	1.1	1.6	.	.	.	.	.	0.5	1.6
720	..OTH PREG COMPL	5	0.4	.	.	0.4	1.1	1.6	.	.	.	.	.	0.5	2.4
120	VIRAL HEPATITIS	3	0.3	.	.	.	0.5	0.8	1.1	.	.	.	.	0.3	1.1
500	ACUTE BRONCHITIS	3	0.3	2.3	.	.	.	.	.	.	.	.	.	0.2	1.8
600	APPENDICITIS	3	0.3	.	.	.	.	.	1.1	.	2.3	5.2	.	0.3	3.4
080	MENINGOCOCCL INF	2	0.2	.	.	.	.	.	.	3.1	.	.	.	0.2	1.2
010	SHIGELL/AMEBIASI	1	0.1	.	.	.	.	.	.	1.5	.	.	.	0.1	.
020	OTH INTSTNL INFS	1	0.1	0.8	.	.	.	.	.	.	.	.	.	0.1	0.6
130	SYPHILIS	1	0.1	.	.	0.4	.	.	.	.	.	.	.	0.1	.
770	SYMP/SIGN/ILL-DF	322	27.0	82.7	1.9	4.5	8.1	7.4	16.8	52.7	89.1	192.7	769.0	26.5	3.7
840	ALL OTH EXTRNL C	36	3.0	2.3	0.4	5.2	4.3	3.3	3.4	3.1	.	5.2	.	3.1	3.4
780	ALL OTHER DISEAS	644	54.1	43.6	3.1	8.6	31.2	59.1	98.6	130.2	246.2	406.2	1196.2	63.9	2.2

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALL AREAS (EXCLUDING CALIFORNIA) MALE

			CRUDE RATE	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	9327	806.6	522.5	55.6	429.6	572.9	766.4	2236.6	2184.1	3877.3	7394.0	15595.2	998.8	1.3
790	ACCIDENTS/ADVERS	2165	187.2	71.8	33.2	249.1	276.3	250.8	264.9	281.2	283.7	322.6	552.5	207.8	3.5
800	..MOTOR VEHICLE	1159	100.2	26.4	13.1	161.8	151.7	130.2	118.8	125.2	122.4	125.1	125.6	108.5	3.3
810	..ALL OTH ACCDNT	1006	87.0	45.4	20.2	87.3	124.5	120.6	126.1	156.0	161.3	197.3	426.9	99.4	3.6
310	DISEASE OF HEART	1824	157.7	14.7	0.7	4.9	21.5	90.0	257.1	639.5	1351.8	2502.0	4947.3	219.0	0.8
350	..ISCHMC HRT DIS	1225	105.9	.	.	0.8	9.1	51.6	187.3	473.2	1004.1	1679.0	2561.5	151.8	0.7
360	....ACUT MYO INF	791	68.4	.	.	0.8	5.1	33.2	131.0	317.2	687.0	1033.7	1135.2	99.9	0.8
390	....OLD MI,OTHER	399	34.5	.	.	.	4.0	17.5	49.0	140.6	283.7	618.9	1356.1	47.4	0.6
370	....OTH ACUT IHD	34	2.9	.	.	.	.	0.9	7.3	15.4	33.4	26.3	25.1	4.4	2.1
380	....ANGINA PECTO	1	0.1	.	.	.	.	.	.	.	.	.	25.1	0.1	0.3
410	..ALL OTH HRT DS	524	45.3	14.7	0.7	2.6	8.5	33.2	62.4	140.6	292.0	737.4	2285.3	58.3	1.1
330	..HYPRTNS HRT DS	27	2.3	.	.	.	.	1.7	2.4	10.3	25.0	52.7	.	3.4	0.5
320	..RHEUM FEVER	25	2.2	.	.	1.5	2.3	2.6	3.7	8.6	13.9	6.6	.	2.9	1.6
400	..OTH ENDOCRD DS	21	1.8	.	.	.	1.7	0.9	1.2	6.9	13.9	26.3	75.3	2.4	1.0
340	..HYPRTNS+RENAL	2	0.2	.	.	.	.	.	.	.	2.8	.	25.1	0.2	0.2
130	MALIG NEOPLASMS	886	76.6	1.5	1.9	5.6	11.9	31.5	126.1	330.9	731.5	1264.2	1406.3	109.1	0.7
170	..MAL NEO-DIGEST	293	25.3	.	.	0.4	3.4	8.7	33.9	108.0	216.9	428.0	652.9	36.1	0.9
180	..MAL NEO-RESPIR	241	20.8	0.7	.	0.4	0.6	4.4	40.4	118.3	222.5	276.5	226.0	31.1	0.3
220	..MAL NEO-OTHER	117	10.1	.	0.7	2.6	2.8	9.6	11.0	25.7	91.8	184.4	175.8	13.7	0.7
200	..MAL NEO-GENITL	85	7.4	.	.	0.8	.	0.9	4.9	20.6	77.9	190.9	226.0	9.9	0.7
210	..MAL NEO-URINAR	55	4.8	.	.	.	2.3	0.9	11.0	25.7	50.1	39.5	50.2	7.1	0.9
240	..OTH NEOP LYMPH	42	3.6	.	.	0.4	0.6	1.7	1.2	15.4	44.5	65.8	50.2	5.1	0.6
230	..LEUKEMIA	32	2.8	0.7	1.1	1.1	2.3	3.5	1.2	6.9	13.9	39.5	25.1	3.4	0.5
160	..MAL NEOPLS-LIP	21	1.8	.	.	.	.	1.7	2.4	10.3	13.9	39.5	.	2.7	0.6
620	LIVER DIS/CIRRHS	450	38.9	.	.	1.5	40.8	115.4	150.6	133.7	89.0	39.5	75.3	57.0	3.6
820	SUICIDE	381	33.0	.	1.1	66.2	63.4	42.8	26.9	18.9	19.5	6.6	.	34.0	1.9
510	PNEUMONIA/INFLNZ	339	29.3	19.[illegible]	2.2	3.0	7.9	13.1	30.6	53.1	122.4	487.2	2610.8	33.2	2.0
520	..PNEUMONIA	328	28.4	18.3	2.2	2.6	7.9	13.1	30.6	53.1	119.6	467.5	2285.3	32.3	2.0
530	..INFLUENZA	11	1.[illegible]	0.7	.	0.4	.	.	.	.	2.8	19.8	125.6	0.9	1.5
830	HOMICIDE	333	28.8	5.1	2.6	46.3	49.3	42.8	44.1	25.7	13.9	.	25.1	31.1	1.9
430	CEREBROVASC DS	330	28.5	2.2	.	1.1	2.3	7.9	28.2	87.4	200.3	711.1	1451.4	37.0	0.9
470	..ALL OTH CBV DS	222	19.2	.	.	.	1.1	4.4	13.5	54.9	125.2	539.9	1130.1	24.4	0.9
440	..INTRCRB HMORG	64	5.5	0.7	.	0.8	0.6	3.5	12.2	27.4	36.2	85.6	100.5	7.9	1.2
450	..CEREBRL THROMB	43	3.7	1.5	.	0.4	0.6	.	2.4	5.1	38.9	79.0	200.9	4.6	0.6
460	..CEREBRL EMBOL	1	0.1	.	.	.	.	.	.	.	.	6.6	.	0.1	0.5
260	DIABETES MELLITU	209	18.1	0.7	.	0.4	5.7	11.4	35.5	97.7	164.1	217.3	150.7	26.7	2.7
740	PERINATAL CONDIT	204	17.6	147.3	0.4	.	.	.	.	.	.	.	.	12.0	1.2

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, All Areas Males (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100.000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
760	..OTH COND PERIN	129	11.2	92.3	0.4	.	.	.	.	.	.	.	.	7.5	1.1
750	..BIRTH TRAUMA	75	6.5	55.0	.	.	.	.	.	.	.	.	.	4.5	1.3
540	CHRON PULMON DIS	123	10.6	1.5	.	1.1	.	.	13.5	36.0	91.8	243.6	401.8	14.2	0.5
580	..OTH CHRN PULMO	93	8.0	.	.	0.8	.	.	6.1	27.4	80.7	177.8	351.6	10.7	0.6
560	..EMPHYSEMA	12	1.0	.	.	0.4	.	.	2.4	1.7	8.3	26.3	25.1	1.4	0.2
550	..BRONCH,CHRON	11	1.0	1.5	.	.	.	.	3.7	1.7	2.8	26.3	.	1.3	0.8
570	..ASTHMA	7	0.6	.	.	.	.	.	1.2	5.1	.	13.2	25.1	0.8	0.8
640	NEPHRITIS, ET AL	104	9.0	0.7	.	1.1	4.5	7.0	13.5	27.4	72.3	118.5	326.5	12.0	2.1
670	..RENAL FAIL,ETC	89	7.7	0.7	.	0.8	4.0	6.1	6.1	25.7	61.2	111.9	326.5	10.1	2.1
660	..CHRN GLMR/NEPH	15	1.3	.	.	0.4	0.6	0.9	7.3	1.7	11.1	6.6	.	1.9	3.2
730	CONGEN ANOMALIES	103	8.9	65.2	0.4	2.3	1.1	1.7	.	1.7	2.8	.	25.1	6.5	1.1
090	SEPTICEMIA	57	4.9	6.6	.	0.4	0.6	3.5	3.7	20.6	50.1	32.9	100.3	6.5	1.9
030	TUBERCULOSIS	43	3.7	0.7	.	0.4	0.6	4.4	6.1	10.3	16.7	72.4	175.8	4.8	4.8
040	..TB-RESPIRATORY	33	2.9	.	.	0.4	0.6	2.6	4.9	8.6	11.1	59.3	150.7	3.7	4.6
050	..OTHER TB	10	0.9	0.7	.	.	.	1.7	1.2	1.7	5.6	13.2	25.1	1.1	11.3
140	ALL OTH INF/PARA	38	3.3	3.7	0.7	0.4	1.1	2.6	4.9	13.7	13.9	32.9	75.3	4.1	2.4
490	OTHER ARTERY DIS	37	3.2	.	.	0.4	1.7	.	4.9	12.0	30.6	65.8	25.1	4.5	0.5
480	ATHEROSCLEROSIS	32	2.8	.	.	.	.	.	2.4	6.9	19.5	32.9	351.6	3.2	0.5
630	CHOLEL/GALLBLDR	29	2.5	.	.	.	.	0.9	2.4	8.6	13.9	72.4	125.6	3.3	4.1
290	MENINGITIS	25	2.2	10.3	.	0.4	0.6	3.5	1.2	3.4	2.8	6.6	.	2.1	3.1
590	ULCER-STOM,DUOD	22	1.9	.	0.4	.	.	1.7	8.6	8.6	5.8	19.8	50.2	2.8	1.2
420	..HYPRTNS+/- RNL	21	1.8	.	.	0.4	.	1.7	4.9	15.4	5.6	19.8	.	2.8	1.3
610	HERNIA/INTST.OBS	17	1.5	.	.	0.4	.	.	2.4	3.4	11.1	39.5	50.2	1.9	1.5
250	BENIGN NEO,OTHER	16	1.4	1.5	.	0.4	.	0.9	.	8.6	11.1	13.2	25.1	1.8	0.9
270	NUTRITION DEFICS	15	1.3	.	0.4	.	.	.	.	.	8.3	32.9	150.7	1.4	2.7
500	ACUTE BRONCHITIS	7	0.6	3.7	.	.	.	.	.	1.7	2.8	.	.	0.6	2.9
680	KIDNEY INFECTION	7	0.6	.	.	.	0.6	.	2.4	1.7	2.8	13.2	.	0.9	1.7
690	PROSTATE HYPERPL	7	0.6	.	.	.	.	.	.	3.4	.	13.2	75.3	0.7	1.7
080	MENINGOCOCCL INF	6	0.5	4.4	.	.	.	.	.	.	.	.	.	0.4	1.8
120	VIRAL HEPATITIS	6	0.5	1.5	.	.	0.6	.	3.7	.	.	.	.	0.7	1.6
280	ANEMIAS	6	0.5	.	.	0.4	.	0.9	.	3.4	2.8	6.6	.	0.7	0.7
020	OTH INTSTNL INFS	5	0.4	3.7	.	.	.	.	.	.	.	.	.	0.3	3.0
010	SHIGELL/AMEBIASI	2	0.2	0.7	.	.	.	.	.	.	.	.	25.1	0.1	.
600	APPENDICITIS	2	0.2	.	.	.	.	.	.	3.4	.	.	.	0.3	0.9
770	SYMP/SIGN/ILL-DF	495	42.8	110.6	4.5	13.2	18.7	17.5	38.0	84.0	180.8	355.5	1105.0	46.1	3.5
840	ALL OTH EXTRNL C	97	8.4	2.2	.	9.8	14.2	11.4	14.7	15.4	22.3	6.6	.	10.0	4.5
780	ALL OTHER DISEAS	884	76.5	43.2	7.3	20.7	49.8	103.1	165.3	226.3	333.8	645.2	1506.8	99.3	2.4

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ABERDEEN BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	1845	945.9	719.3	48.4	403.4	581.3	943.9	1717.4	2792.1	5113.7	9771.5	19230.8	1261.3	2.2
310	DISEASE OF HEART	376	192.8	7.2	.	11.5	18.4	143.4	358.1	846.4	1692.4	2955.1	7265.0	289.0	1.5
350	..ISCHMC HRT DIS	239	122.5	.	.	.	14.7	83.6	244.2	538.6	1110.1	1851.9	4843.3	185.3	1.3
360	....ACUT MYO INF	164	84.1	.	.	.	7.4	71.7	203.5	395.7	855.3	1103.2	1994.3	133.0	1.6
390	....OLD MI,OTHER	74	37.9	.	.	.	7.4	11.9	40.7	142.9	254.8	709.2	2849.0	51.6	0.9
370	....OTH ACUT IHD	1	0.5	.	.	.	.	.	.	.	.	39.4	.	0.7	0.5
410	..ALL OTH HRT DS	122	62.5	7.2	.	4.6	3.7	59.7	97.7	285.8	509.6	985.0	2279.2	92.8	2.3
320	..RHEUM FEVER	8	4.1	.	.	6.9	.	.	8.1	11.0	54.6	.	.	5.7	2.5
340	..HYPRTNS+RENAL	3	1.5	.	.	.	.	.	.	.	.	78.8	142.5	1.8	2.2
330	..HYPRTNS HRT DS	2	1.0	.	.	.	.	.	.	.	18.2	39.4	.	1.6	0.3
400	..OTH ENDOCRD DS	2	1.0	.	.	.	.	.	8.1	11.0	.	.	.	1.8	0.9
790	ACCIDENTS/ADVERS	309	158.4	86.3	34.3	231.5	213.4	197.1	227.9	252.8	218.4	354.6	569.8	182.3	4.6
800	..MOTOR VEHICLE	198	101.5	32.4	16.1	178.8	136.1	149.4	154.6	142.9	54.6	197.0	142.5	116.8	5.4
810	..ALL OTH ACCDNT	111	56.9	53.9	18.2	52.7	77.3	47.8	73.3	109.9	163.8	157.6	427.4	65.3	3.6
150	MALIG NEOPLASMS	193	99.0	7.2	.	4.6	11.0	77.7	187.2	439.7	1055.5	1536.6	1851.9	154.2	1.2
170	..MAL NEO-DIGEST	62	31.8	.	.	2.3	3.7	6.0	16.3	109.9	455.0	630.4	854.7	47.9	1.5
180	..MAL NEO-RESPIR	46	23.6	.	.	.	.	6.0	57.0	164.9	291.2	236.4	142.5	39.4	1.1
220	..MAL NEO-OTHER	29	14.9	3.6	.	2.3	3.7	17.9	40.7	44.0	145.6	157.6	284.9	22.7	1.4
200	..MAL NEO-GENITL	24	12.3	.	.	.	.	17.9	8.1	55.0	72.8	315.2	427.4	18.8	1.4
190	..MAL NEO-BREAST	7	3.6	.	.	.	.	6.0	24.4	11.0	.	39.4	142.5	5.7	0.5
210	..MAL NEO-URINAR	7	3.6	.	.	.	.	6.0	24.4	11.0	36.4	.	.	6.4	1.2
240	..OTH NEOP LYMPH	7	3.6	.	.	.	.	11.9	.	22.0	36.4	39.4	.	5.9	0.9
160	..MAL NEOPLS-LIP	6	3.1	.	.	.	.	.	8.1	22.0	18.2	78.8	.	5.0	1.8
230	..LEUKEMIA	5	2.6	3.6	.	.	3.7	6.0	8.1	.	.	39.4	.	3.4	0.7
620	LIVER DIS/CIRRHS	119	61.0	3.6	.	2.3	77.3	209.1	333.7	142.9	109.2	.	142.5	98.8	8.7
510	PNEUMONIA/INFLNZ	76	39.0	36.0	2.0	4.6	7.4	29.9	57.0	55.0	200.2	669.8	2279.2	48.1	3.9
520	..PNEUMONIA	75	38.5	36.0	2.0	2.3	7.4	29.9	57.0	55.0	200.2	669.8	2279.2	47.7	4.1
530	..INFLUENZA	1	0.5	.	.	2.3	.	.	.	.	.	.	.	0.4	0.7
830	HOMICIDE	73	37.4	7.2	4.0	61.9	62.5	53.8	105.8	22.0	18.2	.	.	45.2	4.4
430	CEREBROVASC DS	71	36.4	.	.	.	11.0	17.9	40.7	76.9	254.8	945.6	2136.8	49.9	1.3
470	..ALL OTH CBV DS	55	28.2	.	.	.	7.4	17.9	32.6	55.0	200.2	630.4	1994.3	38.1	1.5
450	..CERBRL THROM	13	6.7	.	.	.	3.7	.	8.1	11.0	36.4	275.8	142.5	9.4	1.4
440	..INTRCRB HMRRG	3	1.5	.	.	.	.	.	.	11.0	18.2	39.4	.	2.4	0.4
820	SUICIDE	64	32.8	.	2.0	59.6	80.9	53.8	32.6	22.0	.	.	.	37.4	3.3
740	PERINATAL CONDIT	62	31.8	223.0	.	.	.	.	.	.	17.9	1.9	.	17.9	1.9
760	..OTH COND PERIN	47	24.1	169.0	.	.	.	.	.	.	.	.	.	13.3	2.1
750	..BIRTH TRAUMA	15	7.7	53.9	.	.	.	.	.	.	.	.	.	4.3	1.5
260	DIABETES MELLITU	56	28.7	3.6	.	.	3.7	6.0	57.0	109.9	309.4	669.8	284.9	44.6	4.6

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Aberdeen Both Sexes (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)									AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
640	NEPHRITIS, ET AL	29	14.9	.	.	.	7.4	11.9	8.1	55.0	200.2	315.2	.	23.4	5.2
670	..RENAL FAIL,ETC	26	13.3	.	.	.	3.7	11.9	.	55.0	182.0	315.2	.	20.9	5.5
660	..CHRN GLMR/NEPH	3	1.5	.	.	.	3.7	.	8.1	.	18.2	.	.	2.4	4.9
540	CHRON PULMON DIS	22	11.3	.	.	.	.	6.0	24.4	33.0	91.0	275.8	427.4	16.7	1.0
580	..OTH CHRN PULMO	14	7.2	.	.	.	.	6.0	.	22.0	91.0	157.6	284.9	10.5	1.0
560	..EMPHYSEMA	4	2.1	.	.	.	.	.	16.3	.	.	78.8	.	3.3	0.9
550	..BRONCH,CHRON	2	1.0	.	.	.	.	.	8.1	.	.	39.4	.	1.6	1.6
570	..ASTHMA	2	1.0	.	.	.	.	.	.	11.0	.	.	142.5	1.3	1.3
730	CONGEN ANOMALIES	21	10.8	71.9	.	.	3.7	.	.	.	.	.	.	6.4	1.1
030	TUBERCULOSIS	13	6.7	.	.	.	.	.	16.3	22.0	36.4	157.6	427.4	9.4	15.6
050	..OTHER T	7	3.6	.	.	.	.	.	.	11.0	36.4	78.8	284.9	4.8	48.0
040	..TB-RESPIRATORY	6	3.1	.	.	.	.	.	16.3	11.0	.	78.8	142.5	4.6	9.1
490	OTHER ARTERY DIS	12	6.2	.	.	2.3	.	.	.	33.0	72.8	118.2	142.5	9.0	1.7
480	ATHEROSCLEROSIS	10	5.1	.	.	.	.	.	8.1	22.0	54.6	.	569.8	6.9	1.3
090	SEPTICEMIA	8	4.1	7.2	.	.	.	6.0	.	22.0	18.2	78.8	.	5.4	1.9
610	HERNIA/INTST.OBS	6	3.1	.	.	.	.	.	16.3	11.0	18.2	.	284.9	4.5	3.4
630	CHOLEL/GALLBLDR	6	3.1	.	.	.	.	.	8.1	11.0	.	157.6	.	4.6	6.5
590	ULCER-STOM,DUOD	5	2.6	.	.	.	.	.	16.3	22.0	18.2	.	.	4.6	2.7
140	ALL OTH INF/PARA	4	2.1	.	.	.	.	.	.	.	54.6	39.4	.	3.3	2.2
250	BENIGN NEO,OTHER	3	1.5	.	.	.	.	.	.	22.0	18.2	.	.	2.6	7.4
290	MENINGITIS	3	1.5	7.2	.	.	.	.	.	.	.	39.4	.	1.3	2.5
420	..HYPRTNS+/- RNL	3	1.5	.	.	.	.	.	8.1	.	18.2	39.4	.	2.5	1.3
080	MENINGOCOCCL INF	2	1.0	7.2	.	.	.	.	.	.	.	.	.	0.6	2.9
270	NUTRITION DEFICS	2	1.0	.	.	.	.	.	.	.	.	39.4	142.5	1.1	2.2
280	ANEMIAS	2	1.0	3.6	.	.	.	.	.	.	.	39.4	.	1.0	1.1
600	APPENDICITIS	2	1.0	.	.	.	.	.	.	.	18.2	39.4	.	1.6	7.8
680	KIDNEY INFECTION	2	1.0	.	.	.	.	.	.	.	18.2	39.4	.	1.6	3.1
010	SHIGELL/AMEBIASI	1	0.5	.	.	.	.	.	.	.	.	.	142.5	0.4	.
020	OTH INTSTNL INFS	1	0.5	3.6	.	.	.	.	.	.	.	.	.	0.3	2.9
700	PREGNANCY COMPLI	1	0.5	.	.	.	3.7	.	.	.	.	.	.	0.6	6.0
720	..OTH PREG COMPL	1	0.5	.	.	.	3.7	.	.	.	.	.	.	0.6	6.0
770	SYMP/SIGN/ILL-DF	123	63.1	179.8	.	4.6	18.4	23.9	57.0	241.8	218.4	472.8	1282.1	70.0	7.1
840	ALL OTH EXTRNL C	26	13.3	7.2	.	18.3	11.0	17.9	16.3	44.0	54.6	39.4	.	17.0	11.3
780	ALL OTHER DISEAS	139	71.3	57.5	6.1	2.3	51.5	89.6	138.4	285.8	345.8	748.6	1282.1	99.4	2.9

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ABERDEEN FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	747	752.0	618.4	49.3	216.5	356.6	707.6	1087.6	2064.9	4200.8	7713.3	20197.0	954.2	2.3
310	DISEASE OF HEART	136	136.9	14.2	.	13.8	.	34.2	166.2	484.6	1024.6	2184.3	7881.8	181.5	1.3
350	..ISCHMC HRT DIS	80	80.5	.	.	.	.	22.8	75.5	252.8	648.9	1365.2	5418.7	106.2	1.1
360	....ACUT MYO INF	50	50.3	.	.	.	.	22.8	60.4	210.7	478.1	682.6	2463.1	70.6	1.4
390	....OLD MI,OTHER	30	30.2	.	.	.	.	.	15.1	42.1	170.8	682.6	2955.7	35.5	0.8
410	..ALL OTH HRT DS	45	45.3	14.2	.	4.6	.	11.4	75.5	189.6	307.4	614.3	2216.7	60.7	2.0
320	..RHEUM FEVER	5	5.0	.	.	9.2	.	.	.	21.1	68.3	.	.	6.7	2.5
340	..HYPRTNS+RENAL	3	3.0	.	.	.	.	.	.	.	.	136.5	246.3	3.3	4.7
400	..OTH ENDOCRD DS	2	2.0	.	.	.	.	.	15.1	21.1	.	.	.	3.4	2.1
330	..HYPRTNS HRT DS	1	1.0	.	.	.	.	.	.	.	.	68.3	.	1.2	0.2
150	MALIG NEOPLASMS	100	100.7	14.2	.	.	7.0	91.3	211.5	400.3	956.3	1433.4	1724.1	149.3	1.4
170	..MAL NEO-DIGEST	33	33.2	.	.	.	7.0	11.4	30.2	126.4	444.0	546.1	492.6	49.4	1.9
220	..MAL NEO-OTHER	20	20.1	7.1	.	.	.	11.4	75.5	63.2	204.9	204.8	246.3	30.4	2.2
200	..MAL NEO-GENITL	17	17.1	.	.	.	.	34.2	15.1	42.1	68.3	477.8	492.6	23.5	1.8
180	..MAL NEO-RESPIR	14	14.1	.	.	.	.	.	30.2	105.4	204.9	.	246.3	22.6	1.2
190	..MAL NEO-BREAST	7	7.0	.	.	.	.	11.4	45.3	21.1	.	68.3	246.3	10.5	0.5
160	..MAL NEOPLS-LIP	4	4.0	.	.	.	.	.	15.1	21.1	.	136.5	.	5.9	3.9
240	..OTH NEOP LYMPH	3	3.0	.	.	.	.	22.8	.	.	34.2	.	.	4.9	0.9
210	..MAL NEO-URINAR	1	1.0	.	.	.	.	.	.	21.1	.	.	.	1.7	0.8
230	..LEUKEMIA	1	1.0	7.1	.	.	.	.	.	.	.	.	.	0.6	0.1
790	ACCIDENTS/ADVERS	97	97.7	71.1	37.0	129.0	97.9	125.5	120.8	168.6	136.6	136.5	738.9	108.0	5.3
800	..MOTOR VEHICLE	70	70.5	35.5	24.7	119.8	69.9	125.5	90.6	84.3	.	68.3	246.3	77.2	6.8
810	..ALL OTH ACCDNT	27	27.2	35.5	12.3	9.2	28.0	.	30.2	84.3	136.6	68.3	492.6	30.8	3.4
620	LIVER DIS/CIRRHS	56	56.4	7.1	.	4.6	69.9	194.0	271.9	105.4	136.6	.	.	86.3	11.7
430	CEREBROVASC DS	39	39.3	.	.	.	14.0	34.2	30.2	84.3	170.8	750.9	2955.7	48.9	1.4
470	..ALL OTH CBV DS	34	34.2	.	.	.	14.0	34.2	30.2	63.2	136.6	546.1	2955.7	41.9	1.8
450	..CEREBL THROM	4	4.0	.	.	.	.	.	.	21.1	34.2	136.5	.	5.8	1.0
440	..INTRCRB HMRRG	1	1.0	.	.	.	.	.	.	.	.	68.3	.	1.2	0.2
260	DIABETES MELLITU	32	32.2	.	.	.	.	.	30.2	126.4	444.0	614.3	492.6	47.9	5.0
510	PNEUMONIA/INFLNZ	29	29.2	35.5	.	.	.	11.4	15.1	21.1	204.9	546.1	1724.1	33.4	3.6
520	..PNEUMONIA	29	29.2	35.5	.	.	.	11.4	15.1	21.1	204.9	546.1	1724.1	33.4	3.9
830	HOMICIDE	22	22.1	7.1	4.1	27.6	35.0	45.7	60.4	.	34.2	.	.	27.1	6.3
740	PERINATAL CONDIT	20	20.1	142.2	.	.	.	.	.	.	.	.	.	11.2	1.4
760	..OTH COND PERIN	16	16.1	113.7	.	.	.	.	.	.	.	.	.	9.0	1.6
750	..BIRTH TRAUMA	4	4.0	28.4	.	.	.	.	.	.	.	.	.	2.2	1.0
640	NEPHRITIS, ET AL	17	17.1	.	.	.	7.0	22.8	.	84.3	170.8	341.3	.	25.5	7.1
670	..RENAL FAIL,ETC	16	16.1	.	.	.	.	22.8	.	84.3	170.8	341.3	.	24.3	7.9
660	..CHRN GLMR/NEPH	1	1.0	.	.	.	7.0	.	.	.	.	.	.	1.2	2.3
820	SUICIDE	10	10.1	.	.	13.8	35.0	22.8	.	.	.	.	.	.	11.5 2.0

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Aberdeen Females (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
730	CONGEN ANOMALIES	9	9.1	56.9	.	.	7.0	.	.	.	.	.	.	5.6	1.0
030	TUBERCULOSIS	7	7.0	.	.	.	.	. .	15.1	21.1	68.3	136.5	246.3	10.0	25.1
090	SEPTICEMIA	7	7.0	14.2	.	.	.	11.4	.	21.1	34.2	136.5	.	8.5	3.5
050	..OTHER T4	4.0	.	.	.	.	.	.	.	.	68.3	68.3	246.3	5.4	53.9
040	..TB-RESPIRATORY	3	3.0	.	.	.	.	.	15.1	21.1	.	68.3	.	4.6	15.4
540	CHRON PULMON DIS	4	4.0	.	.	.	.	11.4	.	.	68.3	.	246.3	5.8	0.6
590	ULCER-STOM,DUOD	4	4.0	.	.	.	.	.	15.1	42.1	34.2	.	.	6.7	5.6
580	..OTH CHRN PULMO	3	3.0	.	.	.	.	11.4	.	.	68.3	.	.	4.9	0.8
570	..ASTHMA	1	1.0	.	.	.	.	.	.	.	.	.	246.3	0.8	0.7
480	ATHEROSCLEROSIS	3	3.0	.	.	.	.	.	.	21.1	34.2	.	246.3	4.1	0.9
490	OTHER ARTERY DIS	3	3.0	.	.	.	.	.	.	42.1	.	.	246.3	4.1	1.4
610	HERNIA/INTST.OBS	3	3.0	.	.	.	.	.	.	21.1	.	.	492.6	3.3	2.5
140	ALL OTH INF/PARA	2	2.0	.	.	.	.	.	.	.	34.2	68.3	.	2.9	2.2
280	ANEMIAS	2	2.0	7.1	.	.	.	.	.	.	.	.	68.3	.	1.8 2.2
600	APPENDICITIS	2	2.0	.	.	.	.	.	.	.	34.2	68.3	.	2.9	29.1
630	CHOLEL/GALLBLDR	2	2.0	.	.	.	.	.	.	.	.	136.5	.	2.5	3.5
680	KIDNEY INFECTION	2	2.0	.	.	.	.	.	.	.	34.2	68.3	.	2.9	4.8
290	MENINGITIS	1	1.0	.	.	.	.	.	.	.	.	68.3	.	1.2	3.1
420	..HYPRTNS+/- RNL	1	1.0	.	.	.	.	.	.	.	34.2	.	.	1.7	1.0
700	PREGNANCY COMPLI	1	1.0	.	.	.	7.0	.	.	.	.	.	.	1.2	3.8
720	..OTH PREG COMPL	1	1.0	.	.	.	7.0	.	.	.	.	.	.	1.2	3.8
770	SYMP/SIGN/ILL-DF	60	60.4	156.4	.	9.2	21.0	11.4	45.3	252.8	136.6	477.8	1477.8	64.4	9.1
840	ALL OTH EXTRNL C	6	6.0	7.1	.	18.4	.	.	15.1	.	.	.	.	5.7	6.3
780	ALL OTHER DISEAS	70	70.5	85.3	8.2	.	55.9	91.3	90.6	168.6	409.8	477.8	1724.1	88.2	3.1

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ABERDEEN MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	1098	1147.1	822.7	47.5	508.5	830.9	1203.2	2453.2	3584.6	6155.0	12605.0	17785.2	1613.0	2.1
310	DISEASE OF HEART	240	250.7	.	.	9.1	38.8	263.2	582.4	1240.8	2454.2	4014.9	6375.8	414.7	1.5
350	..ISCHMC HRT DIS	159	166.1	.	.	.	31.1	150.4	441.2	850.2	1636.2	2521.0	4026.8	277.9	1.3
360	....ACUT MYO INF	114	119.1	.	.	.	15.5	125.3	370.6	597.4	1285.5	1680.7	1342.3	205.8	1.7
390	....OLD MI,OTHER	44	46.0	.	.	.	15.5	25.1	70.6	252.8	350.6	747.0	2684.6	70.6	0.9
370	....OTH ACUT IHD	1	1.0	.	.	.	.	.	.	.	.	93.4	.	1.5	0.7
410	..ALL OTH HRT DS	77	80.4	.	.	4.6	7.8	112.8	123.5	390.6	740.2	1493.9	2349.0	130.1	2.4
320	..RHEUM FEVER	3	3.1	.	.	4.6	.	.	17.6	.	39.0	.	.	4.8	2.7
330	..HYPRTNS HRT DS	1	1.0	.	.	.	.	.	.	.	39.0	.	.	1.9	0.3
790	ACCIDENTS/ADVERS	212	221.5	101.9	31.7	333.0	341.7	275.7	353.0	344.7	311.6	653.6	335.6	263.4	4.4
800	..MOTOR VEHICLE	128	133.7	29.1	7.9	237.2	209.7	175.5	229.4	206.8	116.9	373.5	.	160.4	4.9
810	..ALL OTH ACCDNT	84	87.8	72.8	23.8	95.8	132.0	100.3	123.5	137.9	194.8	280.1	335.6	103.0	3.7
150	MALIG NEOPLASMS	93	97.2	.	.	9.1	15.5	62.7	158.8	482.5	1168.7	1680.7	2013.4	159.8	1.0
180	..MAL NEO-RESPIR	32	33.4	.	.	.	.	12.5	88.2	229.8	389.6	560.2	.	59.0	1.0
170	..MAL NEO-DIGEST	29	30.3	.	.	4.6	.	.	.	91.9	467.5	747.0	1342.3	46.2	1.1
220	..MAL NEO-OTHER	9	9.4	.	.	4.6	7.8	25.1	.	23.0	77.9	93.4	335.6	13.5	0.7
200	..MAL NEO-GENITL	7	7.3	.	.	.	.	.	.	68.9	77.9	93.4	335.6	11.7	0.8
210	..MAL NEO-URINAR	6	6.3	.	.	.	.	12.5	52.9	.	77.9	.	.	11.9	1.5
230	..LEUKEMIA	4	4.2	.	.	.	7.8	12.5	17.6	.	.	93.4	.	6.6	1.0
240	..OTH NEOP LYMPH	4	4.2	.	.	.	.	.	.	46.0	39.0	93.4	.	7.2	0.9
160	..MAL NEOPLS-LIP	2	2.1	.	.	.	.	.	.	23.0	39.0	.	.	3.7	0.8
620	LIVER DIS/CIRRHS	63	65.8	.	.	.	85.4	225.6	405.5	183.8	77.9	.	335.6	113.4	7.1
820	SUICIDE	54	56.4	.	4.0	104.9	132.0	87.7	70.6	46.0	.	.	.	65.0	3.6
830	HOMICIDE	51	53.3	7.3	4.0	95.8	93.2	62.7	158.8	46.0	.	.	.	64.9	3.9
510	PNEUMONIA/INFLNZ	47	49.1	36.4	4.0	9.1	15.5	50.1	105.9	91.9	194.8	840.3	3020.1	65.3	3.9
520	..PNEUMONIA	46	48.1	36.4	4.0	4.6	15.5	50.1	105.9	91.9	194.8	840.3	3020.1	64.5	4.0
530	..INFLUENZA	1	1.0	.	.	4.6	.	.	.	.	.	.	.	0.8	1.4
740	PERINATAL CONDIT	42	43.9	303.8	.	.	.	.	.	.	.	.	.	24.8	2.4
760	..OTH COND PERIN	31	32.4	225.7	.	.	.	.	.	.	.	.	.	18.3	2.7
750	..BIRTH TRAUMA	11	11.5	80.1	.	.	.	.	.	.	.	.	.	6.5	2.0
430	CEREBROVASC DS	32	33.4	.	.	.	7.8	.	52.9	68.9	350.6	1213.8	1006.7	52.3	1.3
470	..ALL OTH CBV DS	21	21.9	.	.	.	.	.	35.3	46.0	272.7	747.0	671.1	34.9	1.3
450	..CERBRL THROM	9	9.4	.	.	.	7.8	.	17.6	.	39.0	466.9	335.6	13.7	1.8
440	..INTRCRB HMRHG	2	2.1	.	.	.	.	.	.	23.0	39.0	.	.	3.7	0.6
260	DIABETES MELLITU	24	25.1	7.3	.	.	7.8	12.5	88.2	91.9	155.8	747.0	.	41.4	4.1
540	CHRON PULMON DIS	18	18.8	.	.	.	.	.	52.9	68.9	116.9	653.6	671.1	29.9	1.1
580	..OTH CHRN PULMO	11	11.5	.	.	.	.	.	.	46.0	116.9	373.5	671.1	17.1	1.0
560	..EMPHYSEMA	4	4.2	.	.	.	.	.	35.3	.	.	186.7	.	7.3	1.1
550	..BRONCH,CHRON	2	2.1	.	.	.	.	.	17.6	.	.	93.4	.	3.7	2.4
570	..ASTHMA	1	1.0	.	.	.	.	.	.	23.0	.	.	.	1.9	1.9

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Aberdeen Males (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
640	NEPHRITIS, ET AL	12	12.5	.	.	.	7.8	.	17.6	23.0	233.7	280.1	.	21.0	3.8
730	CONGEN ANOMALIES	12	12.5	87.4		.	.	.	.	.	.	.	.	7.1	1.2
670	..RENAL FAIL,ETC	10	10.4	.	.	.	7.8	.	.	23.0	194.8	280.1	.	17.0	3.5
660	..CHRN GLMR/NEPH	2	2.1	.	.	.	.	.	17.6	.	39.0	.	.	4.0	6.7
490	OTHER ARTERY DIS	9	9.4	.	.	4.6	.	.	.	23.0	155.8	280.1	.	14.8	1.7
480	ATHEROSCLEROSIS	7	7.3	.	.	.	.	.	17.6	23.0	77.9	.	1006.7	10.2	1.7
030	TUBERCULOSIS	6	6.3	.	.	.	.	.	17.6	23.0	.	186.7	671.1	8.7	8.7
040	..TB-RESPIRATORY	3	3.1	.	.	.	.	.	17.6	.	.	93.4	335.6	4.5	5.6
050	..OTHER T	3	3.1	.	.	.	.	.	.	23.0	.	93.4	335.6	4.2	42.1
630	CHOLEL/GALLBLDR_	4	4.2	.	.	.	.	.	17.6	23.0	.	186.7	.	7.1	8.8
250	BENIGN NEO,OTHER	3	3.1	.	.	.	.	.	.	46.0	39.0	.	.	5.6	2.7
610	HERNIA/INTST.OBS	3	3.1	.	.	.	.	.	35.3	.	39.0	.	.	6.1	4.7
080	MENINGOCOCCL INF	2	2.1	14.6	.	.	.	.	.	.	.	.	.	1.2	5.9
140	ALL OTH INF/PARA	2	2.1	.	.	.	.	.	.	.	77.9	.	.	3.7	2.2
270	NUTRITION DEFICS	2	2.1	.	.	.	.	.	.	.	.	93.4	335.6	2.3	4.7
290	MENINGITIS	2	2.1	14.6	.	.	.	.	.	.	.	.	.	1.2	1.7
420	..HYPRTNS+/- RNL	2	2.1	.	.	.	.	.	17.6	.	.	93.4	.	3.7	1.7
010	SHIGELL/AMEBIASI	1	1.0	.	.	.	.	.	.	.	.	.	335.6	0.8	.
020	OTH INTSTNL INFS	1	1.0	7.3	.	.	.	.	.	.	.	.	.	0.6	5.9
090	SEPTICEMIA	1	1.0	.	.	.	.	.	.	23.0	.	.	.	1.9	0.6
590	ULCER-STOM,DUOD	1	1.0	.	.	.	.	.	17.6	.	.	.	.	2.1	0.9
770	SYMP/SIGN/ILL-DF	43	65.8	203.9	.	.	15.5	37.6	70.6	229.8	311.6	466.9	1006.7	76.5	5.9
840	ALL OTH EXTRNL C	20	20.9	7.3	.	18.2	23.3	37.6	17.6	91.9	116.9	93.4	.	29.6	13.4
780	ALL OTHER DISEAS	69	72.1	29.1	4.0	4.6	46.6	87.7	194.1	413.6	272.7	1120.4	671.1	113.7	2.

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALASKA BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	1465	742.5	651.9	63.4	424.3	630.6	732.7	940.0	1910.4	2930.5	7241.2	15344.8	918.1	1.6
790	ACCIDENTS/ADVERS	387	196.1	84.3	54.3	247.3	334.8	297.2	248.4	219.2	66.2	222.1	.	210.5	5.3
810	..ALL OTH ACCDNT	335	169.8	75.4	45.3	198.3	308.8	266.4	228.3	167.0	66.2	177.7	.	183.5	10.2
800	..MOTOR VEHICLE	52	26.4	8.9	9.1	49.0	26.0	30.7	20.1	52.2	.	44.4	.	27.0	1.2
310	DISEASE OF HEART	227	115.0	17.7	.	4.3	19.5	46.1	141.0	459.3	927.2	2265.7	5689.7	165.1	0.8
350	..ISCHMC HRT DIS	122	61.8	.	.	.	3.3	20.5	87.3	313.2	529.8	1332.7	2069.0	93.3	0.7
360	....ACUT MYO INF	69	35.0	.	.	.	.	5.1	60.4	198.4	347.7	710.8	517.2	54.3	0.7
390	....OLD MI,OTHER	52	26.4	.	.	.	3.3	15.4	26.9	114.8	182.1	577.5	1551.7	38.2	0.6
370	....OTH ACUT IHD	1	0.5	.	.	.	.	.	.	.	.	44.4	.	0.8	0.6
410	..ALL OTH HRT DS	83	42.1	13.3	.	.	9.8	20.5	53.7	104.4	314.6	666.4	3448.3	56.5	1.4
400	..OTH ENDOCRD DS	12	6.1	.	.	2.1	.	.	.	31.3	33.1	222.1	172.4	8.8	4.4
320	..RHEUM FEVER	8	4.1	4.4	.	2.1	6.5	5.1	.	10.4	33.1	.	.	5.0	2.2
330	..HYPRTNS HRT DS	2	1.0	.	.	.	.	.	.	.	16.6	44.4	.	1.6	0.3
150	MALIG NEOPLASMS	182	92.2	.	.	12.8	26.0	41.0	141.0	469.8	827.8	1599.3	1379.3	138.2	1.0
170	..MAL NEO-DIGEST	61	30.9	.	.	2.1	9.8	5.1	53.7	135.7	314.6	533.1	689.7	46.3	1.4
180	..MAL NEO-RESPIR	40	20.3	.	.	.	.	10.2	20.1	167.0	215.2	222.1	172.4	32.0	0.9
220	..MAL NEO-OTHER	31	15.7	.	.	2.1	9.8	5.1	26.9	62.6	149.0	266.5	172.4	23.2	1.4
200	..MAL NEO-GENITL	22	11.1	.	.	2.1	3.3	15.4	6.7	41.8	99.3	222.1	172.4	16.3	1.2
160	..MAL NEOPLS-LIP	9	4.6	.	.	.	.	5.1	13.4	31.3	16.6	88.8	.	7.1	2.6
230	..LEUKEMIA	6	3.0	.	.	6.4	.	.	6.7	.	.	88.8	.	3.5	0.7
190	..MAL NEO-BREAST	5	2.5	.	.	.	3.3	.	13.4	20.9	.	.	.	3.8	0.3
210	..MAL NEO-URINAR	5	2.5	.	.	.	.	.	.	.	33.1	88.8	172.4	3.6	0.7
240	..OTH NEOP LYMPH	3	1.5	.	.	.	.	.	.	10.4	.	88.8	.	2.4	0.3
430	CEREBROVASC DS	63	31.9	4.4	.	2.1	6.5	46.1	20.1	125.3	215.2	621.9	1379.3	45.7	1.2
470	..ALL OTH CBV DS	50	25.3	.	.	.	3.3	25.6	13.4	104.4	198.7	533.1	1379.3	36.7	1.5
440	..INTRCRB HMRHG	9	4.6	4.4	.	2.1	3.3	20.5	6.7	.	.	44.4	.	5.7	0.9
450	..CEREBL THROM	4	2.0	.	.	.	.	.	.	20.9	16.6	44.4	.	3.2	0.5
510	PNEUMONIA/INFLNZ	58	29.4	57.7	.	4.3	3.3	25.6	40.3	62.6	49.7	488.7	1896.6	35.4	2.9
520	..PNEUMONIA	54	27.4	57.7	.	4.3	3.3	25.6	33.6	62.6	49.7	399.8	1724.1	32.6	2.8
530	..INFLUENZA	4	2.0	.	.	.	.	.	6.7	.	.	88.8	172.4	2.8	4.7
830	HOMICIDE	49	24.8	13.3	2.3	36.2	52.0	35.9	13.4	20.9	16.6	.	.	25.5	2.5
740	PERINATAL CONDIT	43	21.8	186.3	2.3	.	.	.	.	.	.	.	.	15.3	1.7
760	..OTH COND PERIN	30	15.2	128.6	2.3	.	.	.	.	.	.	.	.	10.7	1.7
750	..BIRTH TRAUMA	13	6.6	57.7	.	.	.	.	.	.	.	.	.	4.6	1.6
820	SUICIDE	42	21.3	.	.	40.5	45.5	30.7	20.1	.	.	.	.	21.4	1.9
620	LIVER DIS/CIRRHS	37	18.8	.	.	2.1	13.0	66.6	73.9	62.6	33.1	.	.	27.1	2.4
540	CHRON PULMON DIS	21	10.6	4.4	.	4.3	.	.	6.7	20.9	99.3	222.1	689.7	14.2	0.9
580	..OTH CHRN PULMO	17	8.6	.	.	2.1	.	.	6.7	10.4	99.3	222.1	517.2	12.1	1.2
560	..EMPHYSEMA	3	1.5	.	.	2.1	.	.	.	10.4	.	.	172.4	1.7	0.4
550	..BRONCH,CHRON	1	0.5	4.4	.	.	.	.	.	.	.	.	.	0.4	0.4

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Alaska Both Sexes (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
730	CONGEN ANOMALIES	19	9.6	79.8	.	2.1	.	.	.	.	.	.	.	6.8	1.2
030	TUBERCULOSIS	13	6.6	.	.	.	.	20.5	6.7	31.3	33.1	133.3	.	10.1	16.8
040	..TB-RESPIRATORY	11	5.6	.	.	.	.	15.4	.	31.3	33.1	133.3	.	8.6	17.1
050	..OTHER T	2	1.0	.	.	.	.	5.1	6.7	.	.	.	.	1.5	15.0
640	NEPHRITIS, ET AL	12	6.1	.	.	2.1	.	5.1	.	20.9	49.7	222.1	.	9.0	2.0
670	..RENAL FAIL,ETC	10	5.1	.	.	.	.	5.1	.	10.4	49.7	222.1	.	7.8	2.1
660	..CHRN GLMR/NEPH	2	1.0	.	.	2.1	.	.	.	10.4	.	.	.	1.2	2.5
140	ALL OTH INF/PARA	7	3.5	8.9	.	.	.	.	6.7	31.3	16.6	.	.	4.8	3.2
480	ATHEROSCLEROSIS	7	3.5	.	.	.	.	.	.	.	.	88.8	862.1	3.9	0.8
590	ULCER-STOM,DUOD	7	3.5	.	.	.	.	.	6.7	31.3	16.6	88.8	.	5.6	3.3
090	SEPTICEMIA	6	3.0	4.4	.	.	.	5.1	6.7	.	33.1	44.4	.	4.2	1.5
680	KIDNEY INFECTION	6	3.0	.	.	2.1	.	.	13.4	10.4	16.6	44.4	.	4.4	8.8
260	DIABETES MELLITU	4	2.0	.	.	2.1	.	.	.	.	16.6	88.8	.	2.7	0.3
290	MENINGITIS	4	2.0	13.3	.	.	.	5.1	.	.	.	.	.	1.8	3.6
630	CHOLEL/GALLBLDR_	4	2.0	.	.	.	.	.	.	20.9	.	44.4	172.4	2.9	4.2
250	BENIGN NEO,OTHER	3	1.5	.	.	.	.	.	.	.	.	44.4	344.8	1.7	0.9
610	HERNIA/INTST.OBS	3	1.5	.	.	.	.	.	.	.	.	133.3	.	2.3	1.8
120	VIRAL HEPATITIS	2	1.0	.	.	.	3.3	.	6.7	.	.	.	.	1.3	4.4
420	..HYPRTNS+/- RNL	2	1.0	.	.	2.1	.	.	6.7	.	.	.	.	1.2	0.6
080	MENINGOCOCCL INF	1	0.5	.	.	.	.	.	.	10.4	.	.	.	0.8	4.2
270	NUTRITION DEFICS	1	0.5	.	.	.	.	.	.	.	.	.	172.4	0.5	1.0
280	ANEMIAS	1	0.5	.	.	.	.	.	.	10.4	.	.	.	0.8	0.9
490	OTHER ARTERY DIS	1	0.5	.	.	.	.	.	.	.	16.6	.	.	0.8	0.2
700	PREGNANCY COMPLI	1	0.5	.	.	.	3.3	.	.	.	.	.	.	0.5	5.3
720	..OTH PREG COMPL	1	0.5	.	.	.	3.3	.	.	.	.	.	.	0.5	5.3
770	SYMP/SIGN/ILL-DF	65	32.9	128.6	.	4.3	22.8	15.4	6.7	31.3	99.3	177.7	1551.7	32.4	3.3
840	ALL OTH EXTRNL C	36	18.2	4.4	.	32.0	39.0	10.2	26.9	10.4	16.6	.	.	18.7	12.5
780	ALL OTHER DISEAS	151	76.5	44.3	4.5	23.5	61.8	82.0	147.7	261.0	380.8	710.8	1206.9	102.4	3.0

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALASKA FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	508	522.9	623.2	32.4	211.4	332.8	446.7	752.2	1457.8	2265.9	3604.2	11301.4	661.8	1.6
790	ACCIDENTS/ADVERS	88	90.6	82.5	23.1	94.9	143.6	124.6	164.1	84.5	33.3	87.6	.	97.7	4.8
810	..ALL OTH ACCDNT	77	79.3	73.3	23.1	73.4	124.0	114.3	164.1	63.4	33.3	87.6	.	86.7	9.5
800	..MOTOR VEHICLE	11	11.3	9.2	.	21.6	19.6	10.4	.	21.1	.	.	.	11.0	1.0
310	DISEASE OF HEART	82	84.4	27.5	.	4.3	6.5	.	82.1	274.7	766.4	1926.4	4452.1	122.2	0.9
410	..ALL OTH HRT DS	37	38.1	18.3	.	.	.	.	54.7	42.3	366.5	700.5	3424.7	53.0	1.7
350	..ISCHMC HRT DIS	35	36.0	.	.	.	.	.	27.4	211.3	366.5	788.1	1027.4	55.4	0.6
360	....ACUT MYO INF	25	25.7	.	.	.	.	.	13.7	190.2	299.9	437.8	342.5	40.3	0.8
390	....OLD MI,OTHER	10	10.3	.	.	.	.	.	13.7	21.1	66.6	350.3	684.9	15.1	0.4
400	..OTH ENDOCRD DS	6	6.2	.	.	4.3	.	.	.	.	33.3	350.3	.	8.8	5.5
320	..RHEUM FEVER	3	3.1	9.2	.	.	6.5	.	.	21.1	.	.	.	3.5	1.3
330	..HYPRTNS HRT DS	1	1.0	.	.	.	.	.	.	.	.	87.6	.	1.6	0.3
150	MALIG NEOPLASMS	67	69.0	.	.	21.6	32.6	20.8	109.4	338.1	533.2	1050.8	1027.4	99.9	0.9
170	..MAL NEO-DIGEST	21	21.6	.	.	4.3	6.5	.	13.7	63.4	166.6	613.0	1027.4	31.1	1.2
220	..MAL NEO-OTHER	15	15.4	.	.	4.3	13.1	.	27.4	63.4	166.6	175.1	.	22.4	1.6
200	..MAL NEO-GENITL	14	14.4	.	.	4.3	6.5	20.8	13.7	63.4	100.0	262.7	.	21.0	1.6
180	..MAL NEO-RESPIR	7	7.2	.	.	.	.	.	.	84.5	100.0	.	.	11.5	0.6
190	..MAL NEO-BREAST	5	5.1	.	.	.	6.5	.	27.4	42.3	.	.	.	7.5	0.3
230	..LEUKEMIA	3	3.1	.	.	8.6	.	.	13.7	.	.	.	.	3.2	0.8
160	..MAL NEOPLS-LIP	2	2.1	.	.	.	.	.	13.7	21.1	.	.	.	3.2	2.2
430	CEREBROVASC DS	26	26.8	9.2	.	.	13.1	51.9	27.4	63.4	233.3	350.3	684.9	38.3	1.1
510	PNEUMONIA/INFLNZ	26	26.8	55.0	.	.	.	31.2	41.0	63.4	66.6	262.7	2054.8	33.2	3.6
520	..PNEUMONIA	25	25.7	55.0	.	.	.	31.2	27.4	63.4	66.6	262.7	2054.8	31.7	3.7
470	..ALL OTH CBV DS	21	21.6	.	.	.	6.5	20.8	27.4	63.4	233.3	350.3	684.9	32.1	1.4
440	..INTRCRB HMRHG	5	5.1	9.2	.	.	6.5	31.2	.	.	.	.	.	6.2	1.1
530	..INFLUENZA	1	1.0	.	.	.	.	.	13.7	.	.	.	.	1.6	2.6
620	LIVER DIS/CIRRHS	20	20.6	.	.	4.3	19.6	83.1	68.4	63.4	.	.	.	28.5	3.9
830	HOMICIDE	16	16.5	18.3	4.6	17.3	13.1	41.5	27.4	21.1	.	.	.	18.2	4.2
740	PERINATAL CONDIT	14	14.4	128.3	.	.	.	.	.	.	.	.	.	10.1	1.2
760	..OTH COND PERIN	8	8.2	73.3	.	.	.	.	.	.	.	.	.	5.8	1.0
750	..BIRTH TRAUMA	6	6.2	55.0	.	.	.	.	.	.	.	.	.	4.3	1.9
030	TUBERCULOSIS	8	8.2	.	.	.	.	10.4	13.7	63.4	33.3	175.1	.	12.8	32.0
640	NEPHRITIS, ET AL	8	8.2	.	.	.	.	10.4	.	42.3	33.3	350.3	.	12.7	3.5
730	CONGEN ANOMALIES	8	8.2	73.3	.	.	.	.	.	.	.	.	.	5.8	1.1
820	SUICIDE	8	8.2	.	.	17.3	26.1	.	.	.	.	.	.	7.5	1.3
040	..TB-RESPIRATORY	7	7.2	.	.	.	.	10.4	.	63.4	33.3	175.1	.	11.2	37.5
670	..RENAL FAIL,ETC	7	7.2	.	.	.	.	10.4	.	21.1	33.3	350.3	.	11.1	3.6
050	..OTHER TB	1	1.0	.	.	.	.	.	13.7	.	.	.	.	1.6	15.7
660	..CHRN GLMR/NEPH	1	1.0	.	.	.	.	.	.	21.1	.	.	.	1.7	3.3
540	CHRON PULMON DIS	7	7.2	.	.	.	.	.	13.7	21.1	33.3	350.3	.	11.2	1.2

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Alaska Females (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
580	..OTH CHRN PULMO	6	6.2	.	.	.	.	.	13.7	.	33.3	350.3	.	9.5	1.6
560	..EMPHYSEMA	1	1.0	.	.	.	.	.	.	21.1	.	.	.	1.7	0.9
090	SEPTICEMIA	5	5.1	9.2	.	.	.	10.4	13.7	.	33.3	87.6	.	7.0	2.9
480	ATHEROSCLEROSIS	5	5.1	.	.	.	.	.	.	.	.	175.1	1027.4	6.6	1.4
680	KIDNEY INFECTION	5	5.1	.	.	4.3	.	.	13.7	21.1	33.3	87.6	.	7.2	12.1
140	ALL OTH INF/PARA	3	3.1	18.3	.	.	.	.	13.7	.	.	.	.	3.0	2.3
590	ULCER-STOM,DUOD	3	3.1	.	.	.	.	.	.	21.1	33.3	87.6	.	4.9	4.1
250	BENIGN NEO,OTHER	2	2.1	.	.	.	.	.	.	.	.	.	684.9	2.3	1.3
290	MENINGITIS	2	2.1	18.3	.	.	.	.	.	.	.	.	.	1.4	3.6
080	MENINGOCOCCL INF	1	1.0	.	.	.	.	.	.	21.1	.	.	.	1.7	8.3
120	VIRAL HEPATITIS	1	1.0	.	.	.	6.5	.	.	.	.	.	.	1.1	3.6
420	..HYPRTNS+/- RNL	1	1.0	.	.	.	.	.	13.7	.	.	.	.	1.6	0.9
610	HERNIA/INTST.OBS	1	1.0	.	.	.	.	.	.	.	.	87.6	.	1.6	1.2
630	CHOLEL/GALLBLDR_	1	1.0	.	.	.	.	.	.	21.1	.	.	.	1.7	2.4
700	PREGNANCY COMPLI	1	1.0	.	.	.	6.5	.	.	.	.	.	.	1.1	3.6
720	..OTH PREG COMPL	1	1.0	.	.	.	6.5	.	.	.	.	.	.	1.1	5.4
770	SYMP/SIGN/ILL-DF	26	26.8	146.6	.	4.3	13.1	.	.	21.1	66.6	87.6	684.9	23.3	3.3
840	ALL OTH EXTRNL C	9	9.3	9.2	.	25.9	13.1	.	.	.	.	.	.	7.6	8.5
780	ALL OTHER DISEAS	64	65.9	27.5	4.6	17.3	39.2	62.3	150.4	316.9	366.5	437.8	684.9	91.7	3.2

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALASKA MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	957	955.4	679.0	93.0	632.2	923.7	1011.2	1121.5	2352.5	3584.3	8910.9	19580.4	1164.4	1.5
790	ACCIDENTS/ADVERS	299	298.5	85.9	84.2	396.2	523.2	465.2	329.9	350.8	98.7	360.0	.	319.6	5.3
810	..ALL OTH ACCDNT	258	257.6	77.4	66.5	320.3	490.9	414.6	290.3	268.3	98.7	270.0	.	277.1	10.1
800	..MOTOR VEHICLE	41	40.9	8.6	17.7	75.9	32.3	50.6	39.6	82.5	.	90.0	.	42.5	1.3
310	DISEASE OF HEART	145	144.8	8.6	.	4.2	32.3	91.0	197.9	639.7	1085.2	2610.3	6993.0	206.9	0.8
350	..ISCHMC HRT DIS	87	86.9	.	.	.	6.5	40.4	145.1	412.7	690.6	1890.2	3146.9	129.5	0.6
360	....ACUT MYO INF	44	43.9	.	.	.	.	10.1	105.6	206.4	394.6	990.1	699.3	67.8	0.6
390	....OLD MI,OTHER	42	41.9	.	.	.	6.5	30.3	39.6	206.4	296.0	810.1	2447.6	60.2	0.7
370	....OTH ACUT IHD	1	1.0	.	.	.	.	.	.	.	.	90.0	.	1.5	0.7
410	..ALL OTH HRT DS	46	45.9	8.6	.	.	19.4	40.4	52.8	165.1	263.1	630.1	3496.5	60.6	1.1
400	..OTH ENDOCRD DS	6	6.0	.	.	.	.	.	.	61.9	32.9	90.0	349.7	9.0	3.6
320	..RHEUM FEVER	5	5.0	.	.	4.2	6.5	10.1	.	.	65.8	.	.	6.3	3.5
330	..HYPRTNS HRT DS	1	1.0	.	.	.	.	.	.	.	32.9	.	.	1.6	0.2
150	MALIG NEOPLASMS	115	114.8	.	.	4.2	19.4	60.7	171.5	598.4	1118.1	2160.2	1748.3	175.1	1.1
170	..MAL NEO-DIGEST	40	39.9	.	.	.	12.9	10.1	92.4	206.4	460.4	450.0	349.7	61.8	1.5
180	..MAL NEO-RESPIR	33	32.9	.	.	.	.	20.2	39.6	247.6	328.8	450.0	349.7	51.8	0.9
220	..MAL NEO-OTHER	16	16.0	.	.	.	6.5	10.1	26.4	61.9	131.5	360.0	349.7	23.7	1.2
200	..MAL NEO-GENITL	8	8.0	.	.	.	.	10.1	.	20.6	98.7	180.0	349.7	11.6	0.8
160	..MAL NEOPLS-LIP	7	7.0	.	.	.	.	10.1	13.2	41.3	32.9	180.0	.	10.9	2.4
210	..MAL NEO-URINAR	5	5.0	.	.	.	.	.	.	.	65.8	180.0	349.7	6.9	0.9
230	..LEUKEMIA	3	3.0	.	.	4.2	.	.	.	.	.	180.0	.	3.7	0.6
240	..OTH NEOP LYMPH	3	3.0	.	.	.	.	.	.	20.6	.	180.0	.	4.6	0.6
430	CEREBROVASC DS	37	36.9	.	.	4.2	.	40.4	13.2	185.7	197.3	900.1	2097.9	52.4	1.3
470	..ALL OTH CBV DS	29	29.0	.	.	.	.	30.3	.	144.4	164.4	720.1	2097.9	40.7	1.5
440	..INTRCRB HMRHG	4	4.0	.	.	4.2	.	10.1	13.2	.	.	90.0	.	5.2	0.8
450	..CERBRL THROMB	4	4.0	.	.	.	.	.	.	41.3	32.9	90.0	.	6.4	0.9
820	SUICIDE	34	33.9	.	.	63.2	64.6	60.7	39.6	.	.	.	.	34.8	1.9
830	HOMICIDE	33	32.9	8.6	.	54.8	90.4	30.3	.	20.6	32.9	.	.	32.4	1.9
510	PNEUMONIA/INFLNZ	32	31.9	60.2	.	8.4	6.5	20.2	39.6	61.9	32.9	720.1	1748.3	37.6	2.3
520	..PNEUMONIA	29	29.0	60.2	.	8.4	6.5	20.2	39.6	61.9	32.9	540.1	1398.6	33.8	2.1
530	..INFLUENZA	3	3.0	.	.	.	.	.	.	.	.	180.0	349.7	3.8	6.3
740	PERINATAL CONDIT	29	29.0	240.7	4.4	.	.	.	.	.	.	.	.	20.3	2.0
760	..OTH COND PERIN	22	22.0	180.5	4.4	.	.	.	.	.	.	.	.	15.4	2.2
750	..BIRTH TRAUMA	7	7.0	60.2	.	.	.	.	.	.	.	.	.	4.9	1.5
620	LIVER DIS/CIRRHS	17	17.0	.	.	.	6.5	50.6	79.2	61.9	65.8	.	.	25.8	1.6
540	CHRON PULMON DIS	14	14.0	8.6	.	8.4	.	.	.	20.6	164.4	90.0	1398.6	16.6	0.8
580	..OTH CHRN PULMO	11	11.0	.	.	4.2	.	.	.	20.6	164.4	90.0	1049.0	14.3	0.8
560	..EMPHYSEMA	2	2.0	.	.	4.2	.	.	.	.	.	.	349.7	1.6	0.2
550	..BRONCH,CHRON	1	1.0	8.6	.	.	.	.	.	.	.	.	.	0.7	0.5

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Alaska Males (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)											
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
730	CONGEN ANOMALIES	11	11.0	85.9	.	4.2	.	.	.	.	.	.	.	7.7	1.3
030	TUBERCULOSIS	5	5.0	.	.	.	.	30.3	.	.	32.9	90.0	.	7.3	7.3
040	..TB-RESPIRATORY	4	4.0	.	.	.	.	20.2	.	.	32.9	90.0	.	5.9	7.3
050	..OTHER TB	1	1.0	.	.	.	.	10.1	.	.	.	.	.	1.4	14.0
140	ALL OTH INF/PARA	4	4.0	.	.	.	.	.	.	61.9	32.9	.	.	6.6	3.9
260	DIABETES MELLITU	4	4.0	.	.	4.2	.	.	.	.	32.9	180.0	.	5.3	0.5
590	ULCER-STOM,DUOD	4	4.0	.	.	.	.	.	13.2	41.3	.	90.0	.	6.4	2.8
640	NEPHRITIS, ET AL	4	4.0	.	.	4.2	.	.	.	.	65.8	90.0	.	5.4	1.0
670	..RENAL FAIL,ETC	3	3.0	.	.	.	.	.	.	.	65.8	90.0	.	4.6	0.9
660	..CHRN GLMR/NEPH	1	1.0	.	.	4.2	.	.	.	.	.	.	.	0.8	1.3
630	CHOLEL/GALLBLDR_	3	3.0	.	.	.	.	.	.	20.6	.	90.0	349.7	4.0	5.0
290	MENINGITIS	2	2.0	8.6	.	.	.	10.1	.	.	.	.	.	2.1	3.0
480	ATHEROSCLEROSIS	2	2.0	.	.	.	.	.	.	.	.	.	699.3	1.7	0.3
610	HERNIA/INTST.OBS	2	2.0	.	.	.	.	.	.	.	.	180.0	.	2.9	2.3
090	SEPTICEMIA	1	1.0	.	.	.	.	.	.	.	32.9	.	.	1.6	0.5
120	VIRAL HEPATITIS	1	1.0	.	.	.	.	.	13.2	.	.	.	.	1.6	4.0
250	BENIGN NEO,OTHER	1	1.0	.	.	.	.	.	.	.	.	90.0	.	1.5	0.7
270	NUTRITION DEFICS	1	1.0	.	.	.	.	.	.	.	.	.	349.7	0.8	1.7
280	ANEMIAS	1	1.0	.	.	.	.	.	.	20.6	.	.	.	1.7	1.7
420	..HYPRTNS+/- RNL	1	1.0	.	.	4.2	.	.	.	.	.	.	.	0.8	0.3
490	OTHER ARTERY DIS	1	1.0	.	.	.	.	.	.	.	32.9	.	.	1.6	0.2
680	KIDNEY INFECTION	1	1.0	.	.	.	.	.	13.2	.	.	.	.	1.6	3.2
770	SYMP/SIGN/ILL-DF	39	38.9	111.7	.	4.2	32.3	30.3	13.2	41.3	131.5	270.0	2447.6	40.7	3.1
840	ALL OTH EXTRNL C	27	27.0	.	.	37.9	64.6	20.2	52.8	20.6	32.9	.	.	29.5	13.4
780	ALL OTHER DISEAS	87	86.9	60.2	4.4	29.5	84.0	101.1	145.1	206.4	394.6	990.1	1748.3	112.0	2.7

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALBUQUERQUE BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	750	524.0	277.9	44.9	252.1	320.7	616.0	916.5	1530.6	2357.4	6077.3	14233.6	703.1	1.2
790	ACCIDENTS/ADVERS	152	106.2	63.4	24.0	121.7	111.3	222.7	167.7	119.0	202.8	245.5	182.5	124.4	3.1
800	..MOTOR VEHICLE	94	65.7	32.7	9.0	89.8	84.6	126.2	89.4	51.0	152.1	61.4	.	74.8	3.4
810	..ALL OTH ACCDNT	58	40.5	32.7	15.0	31.9	26.7	96.5	78.2	68.0	50.7	184.2	182.5	49.6	2.8
310	DISEASE OF HEART	81	56.6	5.4	3.0	5.8	4.5	14.8	55.9	272.1	354.9	1105.0	3832.1	80.1	0.4
350	..ISCHMC HRT DIS	45	31.4	.	.	.	.	.	44.7	136.1	278.8	552.5	2372.3	45.8	0.3
360	....ACUT MYO INF	23	16.1	.	.	.	.	.	22.4	68.0	126.7	306.9	1277.4	23.1	0.3
390	....OLD MI,OTHER	22	15.4	.	.	.	.	.	22.4	68.0	152.1	245.5	1094.9	22.7	0.4
410	..ALL OTH HRT DS	29	20.3	5.4	3.0	2.9	.	7.4	.	102.0	76.0	491.1	1459.9	26.9	0.7
320	..RHEUM FEVER	5	3.5	.	.	2.9	4.5	7.4	11.2	17.0	.	.	.	5.0	2.2
400	..OTH ENDOCRD DS	2	1.4	.	.	.	.	.	.	17.0	.	61.4	.	2.4	1.2
150	MALIG NEOPLASMS	74	51.7	.	.	.	13.4	14.8	100.6	204.1	456.3	1350.5	1459.9	82.0	0.6
170	..MAL NEO-DIGEST	26	18.2	.	.	.	4.5	.	44.7	85.0	202.8	368.3	365.0	30.0	0.9
220	..MAL NEO-OTHER	20	14.0	.	.	.	4.5	7.4	.	68.0	152.1	429.7	182.5	22.5	1.3
200	..MAL NEO-GENITL	14	9.8	.	.	.	.	7.4	33.5	17.0	50.7	368.3	182.5	15.7	1.2
180	..MAL NEO-RESPIR	6	4.2	.	.	.	.	.	22.4	.	25.3	122.8	182.5	6.5	0.2
190	..MAL NEO-BREAST	2	1.4	.	.	.	.	.	.	17.0	.	.	182.5	1.9	0.1
210	..MAL NEO-URINAR	2	1.4	.	.	.	.	.	.	17.0	.	.	182.5	1.9	0.4
230	..LEUKEMIA	2	1.4	.	.	.	4.5	.	.	.	.	61.4	.	1.8	0.3
240	..OTH NEOP LYMPH	2	1.4	.	.	.	.	.	.	.	25.3	.	182.5	1.7	0.3
620	LIVER DIS/CIRRHS	43	30.0	.	.	2.9	35.6	111.3	111.8	119.0	50.7	.	.	47.0	4.1
820	SUICIDE	41	28.6	.	.	58.0	49.0	59.4	11.2	.	25.3	.	.	29.3	2.5
260	DIABETES MELLITU	29	20.3	.	.	.	.	7.4	44.7	119.0	304.2	306.9	.	35.9	3.7
510	PNEUMONIA/INFLNZ	27	18.9	.	.	5.8	8.9	.	22.4	51.0	25.3	491.1	1642.3	23.5	1.9
520	..PNEUMONIA	27	18.9	.	.	5.8	8.9	.	22.4	51.0	25.3	491.1	1642.3	23.5	2.0
430	CEREBROVASC DS	25	17.5	.	.	2.9	.	.	22.4	68.0	50.7	491.1	1459.9	23.6	0.6
470	..ALL OTH CBV DS	14	9.8	.	.	.	.	.	.	34.0	50.7	306.9	912.4	13.0	0.5
440	..INTRCRB HMRHG	7	4.9	.	.	.	.	.	22.4	17.0	.	122.8	365.0	7.1	1.2
450	..CEREBL THROMB	4	2.8	.	.	2.9	.	.	.	17.0	.	61.4	182.5	3.5	0.5
830	HOMICIDE	20	14.0	5.4	3.0	14.5	35.6	14.8	33.5	.	.	.	.	15.4	1.5
730	CONGEN ANOMALIES	14	9.8	65.4	.	.	.	.	.	17.0	25.3	.	.	7.8	1.3
640	NEPHRITIS, ET AL	13	9.1	.	.	.	4.5	7.4	11.2	34.0	126.7	184.2	.	15.1	3.4
670	..RENAL FAIL,ETC	11	7.7	.	.	.	4.5	7.4	.	17.0	126.7	184.2	.	12.4	3.3
660	..CHRN GLMR/NEPH	2	1.4	.	.	.	.	.	11.2	17.0	.	.	.	2.7	5.4
740	PERINATAL CONDIT	11	7.7	59.9	.	.	.	.	.	.	.	.	.	4.8	0.5
750	..BIRTH TRAUMA	6	4.2	32.7	.	.	.	.	.	.	.	.	.	2.6	0.9
760	..OTH COND PERIN	5	3.3	27.2	.	.	.	.	.	.	.	.	.	2.2	0.3
090	SEPTICEMIA	8	5.6	.	.	.	.	7.4	.	68.0	50.7	.	182.5	9.5	3.3
480	ATHEROSCLEROSIS	5	3.5	.	.	.	.	7.4	.	.	.	61.4	547.4	3.6	0.7

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Albuquerque Both Sexes (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
630	CHOLEL/GALLBLDR_	4	2.8	.	.	.	.	.	11.2	17.0	25.3	.	182.5	4.4	6.3
140	ALL OTH INF/PARA	3	2.1	5.4	.	.	.	.	11.2	17.0	.	.	.	3.1	2.1
270	NUTRITION DEFICS	3	2.1	.	.	.	.	.	11.2	.	.	.	365.0	2.3	4.7
490	OTHER ARTERY DIS	3	2.1	.	.	.	.	.	.	.	.	61.4	365.0	2.1	0.4
540	CHRON PULMON DIS	3	2.1	.	.	2.9	.	.	.	.	.	61.4	182.5	2.1	0.1
580	..OTH CHRN PULMO	2	1.4	.	.	2.9	.	.	.	.	.	.	182.5	1.0	0.1
570	..ASTHMA	1	0.7	.	.	.	.	.	.	.	.	61.4	.	1.1	1.1
030	TUBERCULOSIS	2	1.4	.	.	.	.	.	.	.	.	122.8	.	2.1	3.5
040	..TB-RESPIRATORY	2	1.4	.	.	.	.	.	.	.	.	122.8	.	2.1	4.2
420	..HYPRTNS+/- RNL	2	1.4	.	.	.	.	.	.	34.0	.	.	.	2.7	1.4
610	HERNIA/INTST.OBS	2	1.4	.	.	.	.	.	.	.	.	122.8	.	2.1	1.6
120	VIRAL HEPATITIS	1	0.7	.	.	.	.	.	11.2	.	.	.	.	1.3	4.4
250	BENIGN NEO,OTHER	1	0.7	.	.	.	.	.	.	.	.	.	182.5	0.5	0.3
290	MENINGITIS	1	0.7	.	.	.	.	7.4	.	.	.	.	.	1.0	2.1
590	ULCER-STOM,DUOD	1	0.7	.	.	.	.	.	11.2	.	.	.	.	1.3	0.8
680	KIDNEY INFECTION	1	0.7	.	.	.	.	.	.	17.0	.	.	.	1.4	2.7
690	PROSTATE HYPERPL	1	0.7	.	.	.	.	.	.	.	.	.	182.5	0.5	5.1
770	SYMP/SIGN/ILL-DF	71	49.6	54.5	15.0	20.3	22.3	7.4	33.5	136.1	228.1	675.3	2189.8	58.9	6.8
840	ALL OTH EXTRNL C	7	4.9	.	.	2.9	4.5	22.3	11.2	17.0	.	.	.	7.0	4.7
780	ALL OTHER DISEAS	101	70.6	16.3	.	14.5	31.2	111.3	234.7	221.1	430.9	798.0	1277.4	108.1	3.1

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALBUQUERQUE FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
			ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	256	347.7	285.1	17.8	89.7	233.6	317.9	630.0	1116.1	1350.0	4273.5	11828.0	467.8	1.1
790	ACCIDENTS/ADVERS	43	58.4	76.8	5.9	39.2	103.8	82.9	105.0	31.9	96.4	122.1	358.4	65.7	3.2
800	..MOTOR VEHICLE	31	42.1	43.9	.	33.6	86.5	69.1	63.0	31.9	96.4	.	.	48.0	4.3
810	..ALL OTH ACCDNT	12	16.3	32.9	5.9	5.6	17.3	13.8	42.0	.	.	122.1	358.4	17.6	1.9
310	DISEASE OF HEART	32	43.5	11.0	5.9	5.6	.	27.6	63.0	127.6	192.9	610.5	3942.7	57.6	0.4
410	..ALL OTH HRT DS	16	21.7	11.0	5.9	.	.	13.8	.	95.7	96.4	366.3	1792.1	28.6	0.9
350	..ISCHMC HRT DIS	13	17.7	.	.	.	.	.	42.0	31.9	96.4	244.2	2150.5	23.6	0.3
390	....OLD MI,OTHER	7	9.5	.	.	.	.	.	21.0	31.9	48.2	.	1433.7	12.0	0.3
360	....ACUT MYO INF	6	8.1	.	.	.	.	.	21.0	.	48.2	244.2	716.8	11.6	0.2
320	..RHEUM FEVER	3	4.1	.	.	5.6	.	13.8	21.0	.	.	.	.	5.4	2.0
150	MALIG NEOPLASMS	30	40.7	.	.	.	17.3	13.8	84.0	159.4	385.7	732.6	1433.7	63.9	0.6
170	..MAL NEO-DIGEST	11	14.9	.	.	.	.	.	21.0	95.7	144.6	366.3	358.4	24.8	1.0
220	..MAL NEO-OTHER	7	9.5	.	.	.	8.7	.	.	31.9	144.6	244.2	.	15.4	1.1
200	..MAL NEO-GENITL	5	6.8	.	.	.	.	13.8	42.0	.	48.2	.	358.4	10.3	0.8
190	..MAL NEO-BREAST	2	2.7	.	.	.	.	.	.	31.9	.	.	358.4	3.7	0.2
230	..LEUKEMIA	2	2.7	.	.	.	8.7	.	.	.	.	122.1	.	3.6	0.9
180	..MAL NEO-RESPIR	1	1.4	.	.	.	.	.	21.0	.	.	.	.	2.4	0.1
210	..MAL NEO-URINAR	1	1.4	.	.	.	.	.	.	.	.	.	358.4	1.2	0.4
240	..OTH NEOP LYMPH	1	1.4	.	.	.	.	.	.	.	48.2	.	.	2.4	0.4
260	DIABETES MELLITU	19	25.8	.	.	.	.	13.8	63.0	127.6	385.7	366.3	.	44.7	4.7
620	LIVER DIS/CIRRHS	17	23.1	.	.	.	26.0	82.9	105.0	63.8	48.2	.	.	35.3	4.8
430	CEREBROVASC DS	8	10.9	.	.	.	.	.	21.0	95.7	.	122.1	1075.3	15.7	0.4
510	PNEUMONIA/INFLNZ	8	10.9	.	.	5.6	.	.	21.0	31.9	.	610.5	.	17.0	1.8
520	..PNEUMONIA	8	10.9	.	.	5.6	.	.	21.0	31.9	.	610.5	.	17.0	2.0
730	CONGEN ANOMALIES	8	10.9	76.8	.	.	.	.	.	.	48.2	.	.	8.4	1.5
470	..ALL OTH CBV DS	4	5.4	.	.	.	.	.	.	63.8	.	122.1	358.4	8.4	0.4
440	..INTRCRB HMRRG	2	2.7	.	.	.	.	.	21.0	.	.	.	358.4	3.6	0.7
450	..CERBRL THROMB	2	2.7	.	.	.	.	.	.	31.9	.	.	358.4	3.7	0.6
480	ATHEROSCLEROSIS	5	6.8	.	.	.	.	13.8	.	.	.	122.1	1075.3	7.7	1.7
820	SUICIDE	5	6.8	.	.	11.2	17.3	13.8	.	.	.	.	.	6.8	1.2
090	SEPTICEMIA	4	5.4	.	.	.	.	13.8	.	95.7	.	.	.	9.5	3.9
830	HOMICIDE	4	5.4	.	.	11.2	17.3	.	.	.	.	.	.	4.9	1.1
740	PERINATAL CONDIT	3	4.1	32.9	.	.	.	.	.	.	.	.	.	2.6	0.3
760	..OTH COND PERIN	2	2.7	21.9	.	.	.	.	.	.	.	.	.	1.7	0.3
750	..BIRTH TRAUMA	1	1.4	11.0	.	.	.	.	.	.	.	.	.	0.9	0.4
140	ALL OTH INF/PARA	2	2.7	11.0	.	.	.	.	.	31.9	.	.	.	3.4	2.6
490	OTHER ARTERY DIS	2	2.7	.	.	.	.	.	.	.	.	122.1	358.4	3.4	1.1
630	CHOLEL/GALLBLDR_	2	2.7	.	.	.	.	.	.	31.9	.	.	358.4	3.7	5.3
640	NEPHRITIS, ET AL	2	2.7	.	.	.	.	.	21.0	.	48.2	.	.	4.8	1.3

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Albuquerque Females (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
660	..CHRN GLMR/NEPH	1	1.4	.	.	.	.	.	21.0	.	.	.	.	2.4	4.8
670	..RENAL FAIL,ETC	1	1.4	.	.	.	.	.	.	.	48.2	.	.	2.4	0.8
030	TUBERCULOSIS	1	1.4	.	.	.	.	.	.	.	.	122.1	.	2.2	5.5
040	..TB-RESPIRATORY	1	1.4	.	.	.	.	.	.	.	.	122.1	.	2.2	7.4
250	BENIGN NEO,OTHER	1	1.4	.	.	.	.	.	.	.	.	.	358.4	1.2	0.7
270	NUTRITION DEFICS	1	1.4	.	.	.	.	.	21.0	.	.	.	.	2.4	6.0
420	..HYPRTNS+/- RNL	1	1.4	.	.	.	.	.	.	31.9	.	.	.	2.5	1.5
540	CHRON PULMON DIS	1	1.4	.	.	.	.	.	.	.	.	.	358.4	1.2	0.1
580	..OTH CHRN PULMO	1	1.4	.	.	.	.	.	.	.	.	.	358.4	1.2	0.2
590	ULCER-STOM,DUOD	1	1.4	.	.	.	.	.	21.0	.	.	.	.	2.4	2.0
610	HERNIA/INTST.OBS	1	1.4	.	.	.	.	.	.	.	.	122.1	.	2.2	1.7
770	SYMP/SIGN/ILL-DF	19	25.8	54.8	5.9	.	8.7	13.8	.	95.7	.	488.4	1433.7	29.8	4.2
840	ALL OTH EXTRNL C	2	2.7	.	.	5.6	8.7	.	.	.	.	.	.	2.5	2.7
780	ALL OTHER DISEAS	34	46.2	21.9	.	11.2	34.6	41.5	105.0	191.3	144.6	732.6	1075.3	66.3	2.3

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

ALBUQUERQUE MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	494	710.8	270.9	72.4	423.8	413.0	961.8	1242.8	2005.8	3472.2	7881.8	15728.6	959.6	1.3
790	ACCIDENTS/ADVERS	109	156.8	54.2	42.2	209.9	119.3	384.7	239.0	218.8	320.5	369.5	.	189.9	3.2
800	..MOTOR VEHICLE	63	90.6	21.7	18.1	149.9	82.6	192.4	119.5	72.9	213.7	123.2	.	104.3	3.2
810	..ALL OTH ACCDNT	46	66.2	32.5	24.1	60.0	36.7	192.4	119.5	145.9	106.8	246.3	.	85.6	3.1
310	DISEASE OF HEART	49	70.5	.	.	6.0	9.2	.	47.8	437.6	534.2	1601.0	3717.5	104.8	0.4
350	..ISCHMC HRT DIS	32	46.0	.	.	.	.	.	47.8	255.3	480.8	862.1	2602.2	70.0	0.3
360	....ACUT MYO INF	17	24.5	.	.	.	.	.	23.9	145.9	213.7	369.5	1858.7	35.6	0.3
390	....OLD MI,OTHER	15	21.6	.	.	.	.	.	23.9	109.4	267.1	492.6	743.5	34.5	0.4
410	..ALL OTH HRT DS	13	18.7	.	.	6.0	.	.	.	109.4	53.4	615.8	1115.2	25.3	0.5
320	..RHEUM FEVER	2	2.9	.	.	.	9.2	.	.	36.5	.	.	.	4.4	2.5
400	..OTH ENDOCRD DS	2	2.9	.	.	.	.	.	.	36.5	.	123.2	.	5.0	2.0
150	MALIG NEOPLASMS	44	63.3	.	.	.	9.2	16.0	119.5	255.3	534.2	1970.4	1487.0	100.4	0.6
170	..MAL NEO-DIGEST	15	21.6	.	.	.	9.2	.	71.7	72.9	267.1	369.5	371.7	35.8	0.9
220	..MAL NEO-OTHER	13	18.7	.	.	.	.	16.0	.	109.4	160.3	615.8	371.7	29.8	1.5
200	..MAL NEO-GENITL	9	12.9	.	.	.	.	.	23.9	36.5	53.4	738.9	.	20.5	1.4
180	..MAL NEO-RESPIR	5	7.2	.	.	.	.	.	23.9	.	53.4	246.3	371.7	10.4	0.2
210	..MAL NEO-URINAR	1	1.4	.	.	.	.	.	.	36.5	.	.	.	3.0	0.4
240	..OTH NEOP LYMPH	1	1.4	.	.	.	.	.	.	.	.	.	371.7	0.9	0.1
820	SUICIDE	36	51.8	.	.	107.9	82.6	112.2	23.9	.	53.4	.	.	53.6	3.0
620	LIVER DIS/CIRRHS	26	37.4	.	.	6.0	45.9	144.3	119.5	182.3	53.4	.	.	60.3	3.8
510	PNEUMONIA/INFLNZ	19	27.3	.	.	6.0	18.4	.	23.9	72.9	53.4	369.5	3345.7	29.5	1.8
520	..PNEUMONIA	19	27.3	.	.	6.0	18.4	.	23.9	72.9	53.4	369.5	3345.7	29.5	1.8
430	CEREBROVASC DS	17	24.5	.	.	6.0	.	.	23.9	36.5	106.8	862.1	1858.7	30.6	0.7
470	..ALL OTH CBV DS	10	14.4	.	.	.	.	.	.	.	106.8	492.6	1487.0	16.7	0.6
440	..INTRCRB HMRHG	5	7.2	.	.	.	.	.	23.9	36.5	.	246.3	371.7	10.8	1.7
450	..CERBRL THROMB	2	2.9	.	.	6.0	.	.	.	.	.	123.2	.	3.1	0.4
830	HOMICIDE	16	23.0	10.8	6.0	18.0	55.1	32.1	71.7	.	.	.	.	27.0	1.6
640	NEPHRITIS, ET AL	11	15.8	.	.	.	9.2	16.0	.	72.9	213.7	369.5	.	25.9	4.6
670	..RENAL FAIL,ETC	10	14.4	.	.	.	9.2	16.0	.	36.5	213.7	369.5	.	23.0	4.7
660	..CHRN GLMR/NEPH	1	1.4	.	.	.	.	.	.	36.5	.	.	.	3.0	5.0
260	DIABETES MELLITU	10	14.4	.	.	.	.	.	23.9	109.4	213.7	246.3	.	26.1	2.6
740	PERINATAL CONDIT	8	11.5	86.7	.	.	.	.	.	.	.	.	.	7.0	0.7
750	..BIRTH TRAUMA	5	7.2	54.2	.	.	.	.	.	.	.	.	.	4.4	1.3
760	..OTH COND PERIN	3	4.3	32.5	.	.	.	.	.	.	.	.	.	2.6	0.4
730	CONGEN ANOMALIES	6	8.6	54.2	.	.	.	.	.	36.5	.	.	.	7.4	1.2
090	SEPTICEMIA	4	5.8	.	.	.	.	.	.	36.5	106.8	.	371.7	9.0	2.6
270	NUTRITION DEFICS	2	2.9	.	.	.	.	.	.	.	.	.	743.5	1.8	3.6
540	CHRON PULMON DIS	2	2.9	.	.	6.0	.	.	.	.	.	123.2	.	3.1	0.1
630	CHOLEL/GALLBLDR_	2	2.9	.	.	.	.	.	23.9	.	53.4	.	.	5.4	6.8

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Albuquerque Males (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
570	..ASTHMA	1	1.4	.	.	.	.	.	.	.	.	123.2	.	2.0	2.0
580	..OTH CHRN PULMO	1	1.4	.	.	6.0	.	.	.	.	.	.	.	1.1	0.1
030	TUBERCULOSIS	1	1.4	.	.	.	.	.	.	.	.	123.2	.	2.0	2.0
040	..TB-RESPIRATORY	1	1.4	.	.	.	.	.	.	.	.	123.2	.	2.0	2.5
120	VIRAL HEPATITIS	1	1.4	.	.	.	.	.	23.9	.	.	.	.	2.9	7.2
140	ALL OTH INF/PARA	1	1.4	.	.	.	.	.	23.9	.	.	.	.	2.9	1.7
290	MENINGITIS	1	1.4	.	.	.	.	16.0	.	.	.	.	.	2.2	3.2
420	..HYPRTNS+/- RNL	1	1.4	.	.	.	.	.	.	36.5	.	.	.	3.0	1.4
490	OTHER ARTERY DIS	1	1.4	.	.	.	.	.	.	.	.	.	371.7	0.9	0.1
610	HERNIA/INTST.OBS	1	1.4	.	.	.	.	.	.	.	.	123.2	.	2.0	1.6
680	KIDNEY INFECTION	1	1.4	.	.	.	.	.	.	36.5	.	.	.	3.0	6.0
690	PROSTATE HYPERPL	1	1.4	.	.	.	.	.	.	.	.	.	371.7	0.9	2.2
770	SYMP/SIGN/ILL-DF	52	74.8	54.2	24.1	42.0	36.7	.	71.7	182.3	480.8	862.1	2974.0	89.8	6.9
840	ALL OTH EXTRNL C	5	7.2	.	.	.	.	48.1	23.9	36.5	.	.	.	12.5	5.7
780	ALL OTHER DISEAS	67	96.4	10.8	.	18.0	27.5	192.4	382.4	255.3	747.9	862.1	1487.0	155.7	3.7

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

BEMIDJI BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	927	707.3	494.8	44.6	231.8	275.7	382.5	892.1	2237.3	4839.5	10031.7	22946.9	943.5	1.7
310	DISEASE OF HEART	295	225.1	14.1	.	3.4	29.0	73.6	311.7	913.8	1941.0	4571.4	10144.9	328.0	1.7
350	..ISCHMC HRT DIS	223	170.1	.	.	.	19.3	51.5	215.0	740.5	1708.1	3428.6	6038.6	253.9	1.8
360	....ACUT MYO INF	151	115.2	.	.	.	14.5	36.8	172.0	551.4	1319.9	1904.8	2657.0	176.2	2.2
390	....OLD MI,OTHER	72	54.9	.	.	.	4.8	14.7	43.0	189.1	388.2	1523.8	3381.6	77.6	1.3
410	..ALL OTH HRT DS	64	48.8	14.1	.	3.4	9.7	14.7	96.7	157.6	207.0	888.9	3864.7	65.5	1.6
320	..RHEUM FEVER	3	2.3	.	.	.	.	7.4	.	15.8	.	63.5	.	3.4	1.5
400	..OTH ENDOCRD DS	3	2.3	.	.	.	.	.	.	.	.	127.0	241.5	2.9	1.4
330	..HYPRTNS HRT DS	2	1.5	.	.	.	.	.	.	.	25.9	63.5	.	2.4	0.4
790	ACCIDENTS/ADVERS	158	120.6	134.3	28.7	141.1	159.6	95.6	150.5	189.1	181.2	381.0	724.6	130.7	3.3
800	..MOTOR VEHICLE	96	73.2	63.6	9.6	114.2	106.4	66.2	86.0	94.5	77.6	127.0	.	77.6	3.6
810	..ALL OTH ACCDNT	62	47.3	70.7	19.1	26.9	53.2	29.4	64.5	94.5	103.5	254.0	724.6	53.1	3.0
150	MALIG NEOPLASMS	129	98.4	7.1	3.2	3.4	4.8	66.2	161.2	409.6	1164.6	1523.8	1449.3	150.4	1.1
170	..MAL NEO-DIGEST	35	26.7	.	.	.	.	14.7	32.2	157.6	284.7	381.0	724.6	40.9	1.3
180	..MAL NEO-RESPIR	33	25.2	.	.	.	.	14.7	43.0	63.0	414.1	254.0	724.6	38.6	1.1
220	..MAL NEO-OTHER	18	13.7	.	3.2	.	4.8	14.7	21.5	63.0	103.5	254.0	.	20.4	1.2
200	..MAL NEO-GENITL	11	8.4	.	.	.	.	.	32.2	15.8	51.8	317.5	.	13.1	1.0
240	..OTH NEOP LYMPH	10	7.6	7.1	.	.	.	7.4	21.5	.	103.5	127.0	.	11.3	1.7
190	..MAL NEO-BREAST	9	6.9	.	.	.	.	14.7	.	63.0	77.6	.	.	10.9	0.9
210	..MAL NEO-URINAR	9	6.9	.	.	.	.	.	10.7	31.5	103.5	127.0	.	11.0	2.2
230	..LEUKEMIA	3	2.3	.	.	3.4	.	.	.	.	25.9	63.5	.	3.0	0.6
160	..MAL NEOPLS-LIP	1	0.8	.	.	.	.	.	.	15.8	.	.	.	1.3	0.5
430	CEREBROVASC DS	52	39.7	.	.	3.4	.	7.4	32.2	63.0	388.2	825.4	3623.2	53.6	1.4
470	..ALL OTH CBV DS	38	29.0	.	.	3.4	.	7.4	21.5	47.3	284.7	571.4	2657.0	39.0	1.5
450	..CEREBRL THROMB	10	7.6	.	.	.	.	.	.	15.8	51.8	190.5	966.2	9.7	1.5
440	..INTRCRB HMRHG	3	2.3	.	.	.	.	.	10.7	.	51.8	.	.	3.8	0.6
460	..CEREBRL EMBOL	1	0.8	.	.	.	.	.	.	.	.	63.5	.	1.1	5.5
620	LIVER DIS/CIRRHS	31	23.7	.	.	.	4.8	51.5	64.5	110.3	155.3	254.0	.	36.3	3.2
510	PNEUMONIA/INFLNZ	27	20.6	7.1	.	.	9.7	7.4	10.7	31.5	129.4	507.9	1690.8	26.7	2.2
520	..PNEUMONIA	24	18.3	7.1	.	.	9.7	7.4	10.7	31.5	103.5	444.4	1449.3	23.7	2.0
530	..INFLUENZA	3	2.3	.	.	.	.	.	.	.	25.9	63.5	241.5	3.0	5.0
260	DIABETES MELLITU	25	19.1	.	.	.	.	14.7	43.0	141.8	207.0	127.0	.	30.7	3.1
820	SUICIDE	25	19.1	.	3.2	47.0	29.0	22.1	10.7	.	.	.	.	18.1	1.6
340	CHRON PULMON DIS	18	13.7	.	.	3.4	4.8	.	10.7	63.0	103.5	444.4	.	20.4	1.3
580	..OTH CHRN PULMO	13	9.9	.	.	.	.	.	10.7	47.3	103.5	317.5	.	15.6	1.3
570	..ASTHMA	4	3.1	.	.	3.4	4.8	.	.	15.8	.	63.5	.	3.8	3.8
550	..BRONCH,CHRON	1	0.8	.	.	.	.	.	.	.	.	63.5	.	1.1	1.1
830	HOMICIDE	15	11.4	14.1	.	16.8	19.3	14.7	10.7	15.8	.	.	.	11.9	1.1
480	ATHEROSCLEROSIS	11	8.4	.	.	.	.	.	.	31.5	77.6	127.0	966.2	11.2	2.1

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Bemidji Both Sexes(cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
740	PERINATAL CONDIT	11	8.4	77.7	.	.	.	.	.	.	.	.	.	6.2	0.7
760	..OTH COND PERIN	8	6.1	56.5	.	.	.	.	.	.	.	.	.	4.5	0.7
750	..BIRTH TRAUMA	3	2.3	21.2	.	.	.	.	.	.	.	.	.	1.7	0.6
730	CONGEN ANOMALIES	10	7.6	70.7	.	.	.	.	.	.	.	.	.	5.7	1.0
090	SEPTICEMIA	9	6.9	7.1	.	3.4	.	.	.	15.8	51.8	127.0	483.1	8.5	2.9
640	NEPHRITIS, ET AL	9	6.9	.	.	.	9.7	.	10.7	31.5	25.9	190.5	.	9.9	2.2
670	..RENAL FAIL,ETC	8	6.1	.	.	.	9.7	.	10.7	31.5	.	190.5	.	8.7	2.3
660	..CHRN GLMR/NEPH	1	0.8	.	.	.	.	.	.	.	25.9	.	.	1.3	2.5
140	ALL OTH INF/PARA	5	3.8	14.1	.	3.4	.	.	.	31.5	.	.	.	4.3	2.8
490	OTHER ARTERY DIS	5	3.8	.	.	.	.	.	10.7	15.8	25.9	63.5	241.5	5.6	1.0
630	CHOLEL/GALLBLDR	4	3.1	.	.	.	.	.	.	.	51.8	63.5	241.5	4.3	6.1
030	TUBERCULOSIS	3	2.3	.	.	.	.	.	10.7	.	.	63.5	241.5	3.0	5.1
040	..TB-RESPIRATORY	3	2.3	.	.	.	.	.	10.7	.	.	63.5	241.5	3.0	6.1
250	BENIGN NEO,OTHER	3	2.3	.	.	.	.	.	.	15.8	51.8	.	.	3.8	2.0
610	HERNIA/INTST.OBS	3	2.3	.	.	.	.	.	.	.	.	63.5	483.1	2.4	1.9
020	OTH INTSTNL INFS	2	1.5	14.1	.	.	.	.	.	.	.	.	.	1.1	11.3
270	NUTRITION DEFICS	2	1.5	7.1	.	.	.	.	.	.	.	63.5	.	1.7	3.3
420	..HYPRTNS+/- RNL	2	1.5	.	.	.	.	.	.	.	.	127.0	.	2.2	1.2
080	MENINGOCOCCL INF	1	0.8	.	.	.	.	.	.	15.8	.	.	.	1.3	6.3
280	ANEMIAS	1	0.8	.	.	.	.	.	.	15.8	.	.	.	1.3	1.4
500	ACUTE BRONCHITIS	1	0.8	.	.	.	.	.	.	15.8	.	.	.	1.3	6.3
590	ULCER-STOM,DUOD	1	0.8	.	.	.	.	.	.	15.8	.	.	.	1.3	0.7
600	APPENDICITIS	1	0.8	.	.	.	.	.	10.7	.	.	.	.	1.3	6.3
690	PROSTATE HYPERPL	1	0.8	.	.	.	.	.	.	.	.	.	241.5	0.7	6.7
770	SYMP/SIGN/ILL-DF	16	12.2	91.9	.	.	.	.	10.7	.	25.9	63.5	.	11.0	1.1
840	ALL OTH EXTRNL C	1	0.8	7.1	.	.	.	.	.	.	.	.	.	0.6	0.4
780	ALL OTHER DISEAS	50	38.2	28.3	9.6	6.7	4.8	29.4	32.2	94.5	258.8	444.4	2415.5	48.3	1.4

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

BEMIDJI FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	381	574.3	358.7	19.2	100.5	121.7	288.1	776.2	1878.8	3958.9	8362.0	21138.2	762.5	1.8
310	DISEASE OF HEART	125	188.4	.	.	.	9.4	14.4	209.8	697.0	1661.8	3665.5	9756.1	262.5	1.9
350	..ISCHMC HRT DIS	92	138.7	.	.	.	.	14.4	146.8	515.2	1270.8	2749.1	6910.6	194.2	2.1
360	....ACUT MYO INF	59	88.9	.	.	.	.	14.4	125.9	424.2	928.6	1489.1	2439.0	130.3	2.6
390	....OLD MI,OTHER	33	49.7	.	.	.	.	.	21.0	90.9	342.1	1260.0	4471.5	63.9	1.5
410	..ALL OTH HRT DS	28	42.2	.	.	.	9.4	.	62.9	151.5	342.1	687.3	2439.0	58.0	1.9
330	..HYPRTNS HRT DS	2	3.0	.	.	.	.	.	.	.	48.9	114.5	.	4.5	0.9
400	..OTH ENDOCRD DS	2	3.0	.	.	.	.	.	.	.	.	114.5	406.5	3.4	2.1
320	..RHEUM FEVER	1	1.5	.	.	.	.	.	.	30.3	.	.	.	2.4	0.9
150	MALIG NEOPLASMS	66	99.5	14.3	6.4	.	9.4	86.4	209.8	424.2	1124.1	1030.9	406.5	148.3	1.4
170	..MAL NEO-DIGEST	19	28.6	.	.	.	.	28.8	42.0	181.8	391.0	.	406.5	43.6	1.7
220	..MAL NEO-OTHER	12	18.1	.	6.4	.	9.4	14.4	42.0	90.9	48.9	343.6	.	25.2	1.8
180	..MAL NEO-RESPIR	10	15.1	.	.	.	.	14.4	21.0	.	293.3	229.1	.	22.9	1.2
190	..MAL NEO-BREAST	9	13.6	.	.	.	.	28.8	.	121.2	146.6	.	.	20.7	0.9
200	..MAL NEO-GENITL	6	9.0	.	.	.	.	.	62.9	30.3	48.9	114.5	.	14.1	1.1
240	..OTH NEOP LYMPH	6	9.0	14.3	.	.	.	.	42.0	.	97.8	114.5	.	12.8	2.3
210	..MAL NEO-URINAR	3	4.5	.	.	.	.	.	.	.	97.8	114.5	.	6.9	2.3
230	..LEUKEMIA	1	1.5	.	.	.	.	.	.	.	.	114.5	.	2.1	0.5
790	ACCIDENTS/ADVERS	46	69.3	129.1	12.8	60.3	84.2	86.4	125.9	30.3	48.9	343.6	.	74.9	3.7
800	..MOTOR VEHICLE	29	43.7	57.4	6.4	60.3	46.8	57.6	62.9	30.3	48.9	114.5	.	46.6	4.1
810	..ALL OTH ACCDNT	17	25.6	71.7	6.4	.	37.4	28.8	62.9	.	.	229.1	.	28.3	3.1
430	CEREBROVASC DS	21	31.7	.	.	6.7	.	.	21.0	60.6	146.6	343.6	4471.5	36.6	1.0
470	..ALL OTH CBV DS	14	21.1	.	.	6.7	.	.	21.0	30.3	97.8	114.5	3252.0	23.7	1.0
450	..CEREBRL THROMB	6	9.0	.	.	.	.	.	.	30.3	.	229.1	1219.5	10.6	1.7
40	..INTRCRN HMRHG	1	1.5	.	.	.	.	.	.	.	48.9	.	.	2.4	0.4
620	LIVER DIS/CIRRHS	16	24.1	.	.	.	.	14.4	42.0	151.5	195.5	458.2	.	36.6	4.9
260	DIABETES MELLITU	15	22.6	.	.	.	.	28.8	42.0	212.1	146.6	114.5	.	34.8	3.6
510	PNEUMONIA/INFLNZ	11	16.6	14.3	.	.	.	.	.	30.3	146.6	687.3	.	23.1	2.5
520	..PNEUMONIA	11	16.6	14.3	.	.	.	.	.	30.3	146.6	687.3	.	23.1	2.7
480	ATHEROSCLEROSIS	7	10.6	.	.	.	.	.	.	60.6	.	229.1	1219.5	13.0	2.8
090	SEPTICEMIA	6	9.0	14.3	.	.	.	.	.	30.3	.	229.1	813.0	10.4	4.3
540	CHRON PULMON DIS	5	7.5	.	.	6.7	9.4	.	.	.	48.9	229.1	.	9.3	1.0
830	HOMICIDE	5	7.5	28.7	.	6.7	9.4	.	21.0	.	.	.	.	7.5	1.7
580	..OTH CHRN PULMO	3	4.5	.	.	.	.	.	.	.	48.9	229.1	.	6.5	1.1
570	..ASTHMA	2	3.0	.	.	6.7	9.4	.	.	.	.	.	.	2.8	2.5
640	NEPHRITIS, ET AL	4	6.0	.	.	.	.	.	21.0	30.3	.	229.1	.	8.9	2.5
670	..RENAL FAIL,ETC	4	6.0	.	.	.	.	.	21.0	30.3	.	229.1	.	8.9	2.9
610	HERNIA/INTST.OBS	3	4.5	.	.	.	.	.	.	.	.	114.5	813.0	4.8	3.7
630	CHOLEL/GALLBLDR	3	4.5	.	.	.	.	.	.	.	97.8	.	406.5	6.1	8.8

[a] Equivalence to ICD-9 codes available from IHS.

[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Bemidji Females (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
730	CONGEN ANOMALIES	3	4.5	43.0	.	.	.	.	.	.	.	.	.	3.4	0.6
820	SUICIDE	3	4.5	.	.	6.7	.	14.4	21.0	.	.	.	.	5.7	1.0
030	TUBERCULOSIS	2	3.0	.	.	.	.	.	21.0	.	.	.	406.5	3.8	9.4
040	..TB-RESPIRATORY	2	3.0	.	.	.	.	.	21.0	.	.	.	406.5	3.8	12.5
140	ALL OTH INF/PARA	2	3.0	14.3	.	6.7	.	.	.	.	.	.	.	2.4	1.8
250	BENIGN NEO,OTHER	2	3.0	.	.	.	.	.	.	.	97.8	.	.	4.8	2.8
270	NUTRITION DEFICS	2	3.0	14.3	.	.	.	.	.	.	.	114.5	.	3.2	8.0
420	..HYPRTNS+/- RNL	2	3.0	.	.	.	.	.	.	.	.	229.1	.	4.1	2.4
740	PERINATAL CONDIT	2	3.0	28.7	.	.	.	.	.	.	.	.	.	2.3	0.3
750	..BIRTH TRAUMA	1	1.5	14.3	.	.	.	.	.	.	.	.	.	1.1	0.5
760	..OTH COND PERIN	1	1.5	14.3	.	.	.	.	.	.	.	.	.	1.1	0.2
020	OTH INTSTNL INFS	1	1.5	14.3	.	.	.	.	.	.	.	.	.	1.1	11.3
080	MENINGOCOCCL INF	1	1.5	.	.	.	.	.	.	30.3	.	.	.	2.4	11.9
490	OTHER ARTERY DIS	1	1.5	.	.	.	.	.	.	.	.	.	406.5	1.3	0.4
600	APPENDICITIS	1	1.5	.	.	.	.	.	21.0	.	.	.	.	2.4	24.1
770	SYMP/SIGN/ILL-DF	4	6.0	43.0	.	.	.	.	.	.	48.9	.	.	5.8	0.8
780	ALL OTHER DISEAS	22	33.2	.	.	6.7	.	43.2	21.0	121.2	195.5	343.6	2439.0	43.1	1.5

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

BEMIDJI MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	546	843.6	626.9	69.7	363.9	440.4	480.8	1013.9	2625.5	5830.6	12125.5	25903.6	1142.1	1.5
310	DISEASE OF HEART	170	262.7	27.9	.	6.7	50.0	135.2	418.8	1148.7	2255.2	5706.1	10843.4	402.2	1.5
350	..ISCHMC HRT DIS	131	202.4	.	.	.	40.0	90.2	286.5	984.6	2200.2	4279.6	4819.3	321.1	1.6
360	....ACUT MYO INF	92	142.1	.	.	.	30.0	60.1	220.4	689.2	1760.2	2425.1	3012.0	227.4	1.9
390	....OLD MI,OTHER	39	60.3	.	.	.	10.0	30.1	66.1	295.4	440.0	1854.5	1807.2	93.7	1.1
410	..ALL OTH HRT DS	36	55.6	27.9	.	6.7	10.0	30.1	132.2	164.1	55.0	1141.2	6024.1	74.3	1.4
320	..RHEUM FEVER	2	3.1	.	.	.	.	15.0	.	.	.	142.7	.	4.4	2.5
400	..OTH ENDOCRD DS	1	1.5	.	.	.	.	.	.	.	.	142.7	.	2.3	0.9
790	ACCIDENTS/ADVERS	112	173.0	139.3	44.3	222.4	240.2	105.2	176.3	361.0	330.0	428.0	1807.2	189.7	3.2
800	..MOTOR VEHICLE	67	103.5	69.7	12.7	168.5	170.1	75.1	110.2	164.1	110.0	142.7	.	109.9	3.4
810	..ALL OTH ACCDNT	45	69.5	69.7	31.7	53.9	70.1	30.1	66.1	196.9	220.0	285.3	1807.2	79.7	2.9
150	MALIG NEOPLASMS	63	97.3	.	.	6.7	.	45.1	110.2	393.8	1210.1	2139.8	3012.0	153.2	0.9
180	..MAL NEO-RESPIR	23	35.5	.	.	.	.	15.0	66.1	131.3	550.1	285.3	1807.2	56.2	0.9
170	..MAL NEO-DIGEST	16	24.7	.	.	.	.	.	22.0	131.3	165.0	855.9	1204.8	38.2	0.9
210	..MAL NEO-URINAR	6	9.3	.	.	.	.	.	22.0	65.6	110.0	142.7	.	15.6	2.0
220	..MAL NEO-OTHER	6	9.3	.	.	.	.	15.0	.	32.8	165.0	142.7	.	15.0	0.7
200	..MAL NEO-GENITL	5	7.7	.	.	.	.	.	.	.	55.0	570.6	.	12.0	0.8
240	..OTH NEOP LYMPH	4	6.2	.	.	.	.	15.0	.	.	110.0	142.7	.	9.7	1.2
230	..LEUKEMIA	2	3.1	.	.	6.7	.	.	.	.	55.0	.	.	3.8	0.6
160	..MAL NEOPLS-LIP	1	1.5	.	.	.	.	.	.	32.8	.	.	.	2.7	0.6
430	CEREBROVASC DS	31	47.9	.	.	.	.	15.0	44.1	65.6	660.1	1426.5	2409.6	73.5	1.8
470	..ALL OTH CBV DS	24	37.1	.	.	.	.	15.0	22.0	65.6	495.0	1141.2	1807.2	56.8	2.1
450	..CERBRL THROMB	4	6.2	.	.	.	.	.	.	.	110.0	142.7	602.4	9.0	1.2
440	..INTRCRB HMRHG	2	3.1	.	.	.	.	.	22.0	.	55.0	.	.	5.3	0.8
460	..CEREBRL EMBOL	1	1.5	.	.	.	.	.	.	.	.	142.7	.	2.3	11.7
820	SUICIDE	22	34.0	.	6.3	87.6	60.0	30.1	.	.	.	.	.	30.6	1.7
510	PNEUMONIA/INFLNZ	16	24.7	.	.	.	20.0	15.0	22.0	32.8	110.0	285.3	4216.9	30.6	1.8
520	..PNEUMONIA	13	20.1	.	.	.	20.0	15.0	22.0	32.8	55.0	142.7	3614.5	24.2	1.5
530	..INFLUENZA	3	4.6	.	.	.	.	.	.	.	55.0	142.7	602.4	6.4	10.7
620	LIVER DIS/CIRRHS	15	23.2	.	.	.	10.0	90.2	88.2	65.6	110.0	.	.	35.4	2.2
540	CHRON PULMON DIS	13	20.1	.	.	.	.	.	22.0	131.3	165.0	713.3	.	33.0	1.3
580	..OTH CHRN PULMO	10	15.5	.	.	.	.	.	22.0	98.5	165.0	428.0	.	25.6	1.5
570	..ASTHMA	2	3.1	.	.	.	.	.	.	32.8	.	142.7	.	5.0	5.0
550	..BRONCH,CHRON	1	1.5	.	.	.	.	.	.	.	.	142.7	.	2.3	1.6
260	DIABETES MELLITU	10	15.5	.	.	.	.	.	44.1	65.6	275.0	142.7	.	26.2	2.6
830	HOMICIDE	10	15.5	.	.	27.0	30.0	30.1	.	32.8	.	.	.	16.5	1.0
740	PERINATAL CONDIT	9	13.9	125.4	.	.	.	.	.	.	.	.	.	10.2	1.0
760	..OTH COND PERIN	7	10.8	97.5	.	.	.	.	.	.	.	.	.	7.9	1.1
750	..BIRTH TRAUMA	2	3.1	27.9	.	.	.	.	.	.	.	.	.	2.3	0.7

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Bemidji Males (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
730	CONGEN ANOMALIES	7	10.8	97.5	.	.	.	.	.	.	.	.	.	7.9	1.3
640	NEPHRITIS, ET AL	5	7.7	.	.	.	20.0	.	.	32.8	55.0	142.7	.	10.8	1.9
670	..RENAL FAIL,ETC	4	6.2	.	.	.	20.0	.	.	32.8	.	142.7	.	8.2	1.7
660	..CHRN GLMR/NEPH	1	1.5	.	.	.	.	.	.	.	55.0	.	.	2.6	4.4
480	ATHEROSCLEROSIS	4	6.2	.	.	.	.	.	.	.	165.0	.	602.4	9.4	1.6
490	OTHER ARTERY DIS	4	6.2	.	.	.	.	.	22.0	32.8	55.0	142.7	.	10.3	1.2
090	SEPTICEMIA	3	4.6	.	.	6.7	.	.	.	.	110.0	.	.	6.5	1.9
140	ALL OTH INF/PARA	3	4.6	13.9	.	.	.	.	.	65.6	.	.	.	6.5	3.8
020	OTH INTSTNL INFS	1	1.5	13.9	.	.	.	.	.	.	.	.	.	1.1	11.3
030	TUBERCULOSIS	1	1.5	.	.	.	.	.	.	.	.	142.7	.	2.3	2.3
040	..TB-RESPIRATORY	1	1.5	.	.	.	.	.	.	.	.	142.7	.	2.3	2.9
250	BENIGN NEO,OTHER	1	1.5	.	.	.	.	.	.	32.8	.	.	.	2.7	1.3
280	ANEMIAS	1	1.5	.	.	.	.	.	.	32.8	.	.	.	2.7	2.7
500	ACUTE BRONCHITIS	1	1.5	.	.	.	.	.	.	32.8	.	.	.	2.7	13.4
590	ULCER-STOM,DUOD	1	1.5	.	.	.	.	.	.	32.8	.	.	.	2.7	1.2
630	CHOLEL/GALLBLDR	1	1.5	.	.	.	.	.	.	.	.	142.7	.	2.3	2.9
690	PROSTATE HYPERPL	1	1.5	.	.	.	.	.	.	.	.	.	602.4	1.4	3.6
770	SYMP/SIGN/ILL-DF	12	18.5	139.3	.	.	.	.	22.0	.	.	142.7	.	16.3	1.3
840	ALL OTH EXTRNL C	1	1.5	13.9	.	.	.	.	.	.	.	.	.	1.1	0.5
780	ALL OTHER DISEAS	28	43.3	55.7	19.0	6.7	10.0	15.0	44.1	65.6	330.0	570.6	2409.6	54.3	1.3

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

BILLINGS BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	1040	943.3	517.8	66.6	486.0	629.8	970.7	1785.7	3109.1	4687.0	8892.1	14854.1	1260.3	2.2
790	ACCIDENTS/ADVERS	231	209.5	70.0	35.3	304.2	303.2	254.5	243.5	371.5	353.1	437.3	530.3	236.1	5.9
800	..MOTOR VEHICLE	149	135.1	14.0	19.6	264.7	192.4	131.9	148.8	176.0	128.4	291.5	.	145.0	6.7
810	..ALL OTH ACCDNT	82	74.4	56.0	15.7	39.5	110.8	122.5	94.7	195.5	224.7	145.8	530.5	91.1	5.1
310	DISEASE OF HEART	207	187.7	14.0	.	.	46.7	84.8	311.1	938.6	1540.9	3425.7	5835.5	282.6	1.4
350	..ISCHMC HRT DIS	121	109.7	.	.	.	11.7	9.4	257.0	547.5	995.2	1967.9	3448.3	169.2	1.2
360	....ACUT MYO INF	79	71.7	.	.	.	11.7	9.4	162.3	410.6	674.2	1166.2	1591.5	112.5	1.4
390	....OLD MI,OTHER	42	38.1	.	.	.	.	.	94.7	136.9	321.0	801.7	1856.8	56.7	0.9
410	..ALL OTH HRT DS	75	68.0	14.0	.	.	29.2	56.5	54.1	332.4	481.5	1239.1	2387.3	98.2	2.4
320	..RHEUM FEVER	6	5.4	.	.	.	5.8	18.8	.	39.1	32.1	.	.	8.3	3.6
330	..HYPRTNS HRT DS	2	1.8	.	.	.	.	.	.	19.6	.	72.9	.	2.8	0.5
400	..OTH ENDOCRD DS	2	1.8	.	.	.	.	.	.	.	32.1	72.9	.	2.8	1.4
340	..HYPRTNS+RENAL	1	0.9	.	.	.	.	.	.	.	.	72.9	.	1.3	1.6
150	MALIG NEOPLASMS	110	99.8	.	3.9	11.9	.	37.7	270.6	508.6	802.6	1530.6	1591.5	136.8	1.2
180	..MAL NEO-RESPIR	32	29.0	.	.	.	.	.	108.2	156.4	288.9	437.3	265.3	47.6	1.3
170	..MAL NEO-DIGEST	23	20.9	.	.	.	.	.	40.6	176.0	128.4	437.3	265.3	33.4	1.0
220	..MAL NEO-OTHER	19	17.2	.	3.9	4.0	.	.	54.1	78.2	192.6	218.7	.	27.2	1.6
200	..MAL NEO-GENITL	13	11.8	.	.	4.0	.	9.4	54.1	19.6	96.3	145.8	265.3	17.9	1.3
190	..MAL NEO-BREAST	9	8.2	.	.	.	.	18.8	13.5	58.7	64.2	.	265.3	12.8	1.0
230	..LEUKEMIA	5	4.5	.	.	4.0	.	9.4	.	19.6	.	72.9	265.3	5.6	1.1
240	..OTH NEOP LYMPH	5	4.5	.	.	.	.	.	.	19.6	32.1	145.8	265.3	6.4	0.9
210	..MAL NEO-URINAR	4	3.6	.	.	.	.	.	.	58.7	.	72.9	.	6.0	1.2
620	LIVER DIS/CIRRHS	80	72.6	.	.	4.0	64.1	216.8	338.2	293.3	128.4	72.9	.	112.2	9.8
830	HOMICIDE	38	34.5	7.0	3.9	63.2	58.3	56.5	54.1	.	.	.	.	36.4	3.5
430	CEREBROVASC DS	34	30.8	.	.	.	5.8	.	40.6	58.7	353.1	728.9	1591.5	44.6	1.2
470	..ALL OTH CBV DS	16	14.5	.	.	.	5.8	.	13.5	.	96.3	437.3	1326.3	18.4	0.7
440	..INTRCRB HMRHG	11	10.0	.	.	.	.	.	27.1	58.7	128.4	145.8	.	16.6	2.8
450	..CEREBL THROMB	7	6.3	.	.	.	.	.	.	.	128.4	145.8	265.3	9.5	1.4
820	SUICIDE	32	29.0	.	.	51.4	35.0	75.4	13.5	58.7	32.1	.	.	33.4	2.9
510	PNEUMONIA/INFLNZ	29	26.3	7.0	7.8	.	5.8	.	67.6	58.7	160.5	437.3	1591.5	35.3	2.9
520	..PNEUMONIA	25	22.7	7.0	7.8	.	5.8	.	54.1	39.1	160.5	364.4	1326.3	30.1	2.6
530	..INFLUENZA	4	3.6	.	.	.	.	.	13.5	19.6	.	72.9	265.3	5.2	8.6
260	DIABETES MELLITU	27	24.5	.	.	.	11.7	9.4	27.1	156.4	192.6	583.1	.	38.4	3.9
740	PERINATAL CONDIT	22	20.0	153.9	.	.	.	.	.	.	.	.	.	12.3	1.3
760	..OTH COND PERIN	16	14.5	112.0	.	.	.	.	.	.	.	.	.	9.0	1.4
750	..BIRTH TRAUMA	6	5.4	42.0	.	.	.	.	.	.	.	.	.	3.4	1.2
540	CHRON PULMON DIS	19	17.2	.	.	.	.	.	27.1	78.2	192.6	510.2	.	27.6	1.7
580	..OTH CHRN PULMO	12	10.9	.	.	.	.	.	13.5	58.7	128.4	291.5	.	17.6	1.7
560	..EMPHYSEMA	5	4.5	.	.	.	.	.	13.5	19.6	64.2	72.9	.	7.5	2.0

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Billings Both Sexes(cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
550	..BRONCH,CHRON	2	1.8	.	.	.	.	.	.	.	.	145.8	.	2.5	2.5
640	NEPHRITIS, ET AL	12	10.9	14.0	.	.	11.7	28.3	.	19.6	64.2	145.8	.	14.1	3.1
670	..RENAL FAIL,ETC	11	10.0	14.0	.	.	11.7	18.8	.	19.6	64.2	145.8	.	12.8	3.4
660	..CHRN GLMR/NEPH	1	0.9	.	.	.	.	9.4	.	.	.	.	.	1.3	2.6
090	SEPTICEMIA	10	9.1	.	.	.	.	28.3	13.5	58.7	96.3	.	.	14.9	5.1
140	ALL OTH INF/PARA	8	7.3	7.0	.	4.0	5.8	.	13.5	19.6	32.1	145.8	.	9.5	6.3
730	CONGEN ANOMALIES	8	7.3	56.0	.	.	.	.	.	.	.	[illegible]	.	4.5	0.8
030	TUBERCULOSIS	5	4.5	.	.	.	.	.	13.5	19.6	64.2	72.9	.	7.5	12.6
630	CHOLEL/GALLBLDR	5	4.5	.	.	7.9	.	.	.	.	96.3	.	.	6.1	8.7
040	..TB-RESPIRATORY	3	2.7	.	.	.	.	.	13.5	19.6	.	72.9	.	4.4	8.8
050	..OTHER TB	2	1.8	.	.	.	.	.	.	.	64.2	.	.	3.1	31.1
480	ATHEROSCLEROSIS	4	3.6	.	.	.	.	.	13.5	19.6	.	72.9	265.3	5.2	1.0
490	OTHER ARTERY DIS	3	2.7	.	.	.	5.8	.	13.5	19.6	.	.	.	4.1	0.8
500	ACUTE BRONCHITIS	3	2.7	21.0	.	.	.	.	.	.	.	.	.	1.7	8.4
590	ULCER-STOM,DUOD	3	2.7	.	.	.	.	.	13.5	19.6	32.1	.	.	4.7	2.8
610	HERNIA/INTST.OBS	3	2.7	7.0	.	.	.	.	.	19.6	.	.	265.3	2.9	2.2
250	BENIGN NEO,OTHER	2	1.8	.	.	4.0	.	.	.	.	32.1	.	.	2.3	1.2
270	NUTRITION DEFICS	2	1.8	.	.	.	.	.	.	.	32.1	.	265.3	2.3	4.6
420	..HYPRTNS+/- RNL	2	1.8	.	.	.	.	.	13.5	.	32.1	.	.	3.1	1.7
120	VIRAL HEPATITIS	1	0.9	7.0	.	.	.	.	.	.	.	.	.	0.6	1.9
130	SYPHILIS	1	0.9	.	.	4.0	.	.	.	.	.	.	.	0.7	.
690	KIDNEY INFECTION	1	0.9	.	.	.	.	.	.	.	32.1	.	.	1.6	3.1
770	SYMP/SIGN/ILL-DF	29	26.3	132.9	.	4.0	.	.	.	58.7	64.2	72.9	795.8	22.6	2.3
840	ALL OTH EXTRNL C	3	2.7	.	.	.	5.8	9.4	.	.	32.1	.	.	3.8	2.5
780	ALL OTHER DISEAS	106	96.1	21.0	15.7	27.7	70.0	169.6	297.6	254.2	321.0	656.0	2122.0	132.6	3.9

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

BILLINGS FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	424	762.6	533.7	39.6	284.7	490.3	697.1	1436.0	2334.6	38	7323.6	14027.1	997.1	2.4
310	DISEASE OF HEART	88	158.3	14.0	.	.	57.0	73.4	182.8	622.6	1477.8	2929.4	4072.4	229.6	1.7
350	..ISCHMC HRT DIS	46	82.7	.	.	.	11.4	.	156.7	311.3	800.5	1597.9	2714.9	121.5	1.3
360	....ACUT MYO INF	26	46.8	.	.	.	11.4	.	52.2	233.5	431.0	932.1	1357.5	68.7	1.4
390	....OLD MI,OTHER	20	36.0	.	.	.	.	.	104.4	77.8	369.5	665.8	1357.5	52.8	1.2
410	..ALL OTH HRT DS	35	63.0	14.0	.	.	34.2	55.0	26.1	272.4	615.8	932.1	1357.5	90.4	2.9
320	..RHEUM FEVER	3	5.4	.	.	.	11.4	18.3	.	.	61.6	.	.	7.5	2.8
330	..HYPRTNS HRT DS	2	3.6	.	.	.	.	.	.	38.9	.	133.2	.	5.5	1.1
340	..HYPRTNS+RENAL	1	1.8	.	.	.	.	.	.	.	.	133.2	.	2.4	3.4
400	..OTH ENDOCRD DS	1	1.8	.	.	.	.	.	.	.	.	133.2	.	2.4	1.5
790	ACCIDENTS/ADVERS	63	113.3	42.1	15.8	166.1	205.2	73.4	104.4	233.5	123.2	133.2	905.0	122.4	6.0
800	..MOTOR VEHICLE	46	82.7	14.0	7.9	166.1	148.2	18.3	104.4	155.6	61.6	.	.	87.2	7.7
810	..ALL OTH ACCDNT	17	30.6	28.1	7.9	.	57.0	55.0	.	77.8	61.6	133.2	905.0	35.2	3.9
150	MALIG NEOPLASMS	59	106.1	.	.	15.8	.	55.0	339.4	505.8	738.9	1464.7	2262.4	159.6	1.5
180	..MAL NEO-RESPIR	16	28.8	.	.	.	.	.	130.5	155.6	246.3	399.5	.	46.5	2.5
170	..MAL NEO-DIGEST	11	19.8	.	.	.	.	.	26.1	116.7	123.2	532.6	452.5	29.3	1.1
190	..MAL NEO-BREAST	9	16.2	.	.	.	.	36.7	26.1	116.7	123.2	.	452.5	24.8	1.1
200	..MAL NEO-GENITL	9	16.2	.	.	7.9	.	18.3	78.3	38.9	61.6	133.2	452.5	23.0	1.7
220	..MAL NEO-OTHER	8	14.4	.	.	.	.	.	78.3	38.9	184.7	133.2	.	23.5	1.7
230	..LEUKEMIA	3	5.4	.	.	7.9	.	.	.	.	.	133.2	452.5	5.4	1.3
240	..OTH NEOP LYMPH	2	3.6	.	.	.	.	.	.	.	.	133.2	452.5	3.9	0.7
210	..MAL NEO-URINAR	1	1.8	.	.	.	.	.	.	38.9	.	.	.	3.1	1.0
620	LIVER DIS/CIRRHS	40	71.9	.	.	7.9	45.6	201.8	391.6	233.5	123.2	133.2	.	109.0	14.7
260	DIABETES MELLITU	18	32.4	.	.	.	11.4	.	26.1	233.5	307.9	665.8	.	50.4	5.2
740	PERINATAL CONDIT	15	27.0	210.7	.	.	.	.	.	.	.	.	.	16.7	2.0
760	..OTH COND PERIN	10	18.0	140.4	.	.	.	.	.	.	.	.	.	11.1	1.9
750	..BIRTH TRAUMA	5	9.0	70.2	.	.	.	.	.	.	.	.	.	5.6	2.4
430	CEREBROVASC DS	14	25.2	.	.	.	11.4	.	26.1	.	246.3	532.6	1810.0	32.6	0.9
510	PNEUMONIA/INFLNZ	14	25.2	14.0	15.8	.	11.4	.	78.3	38.9	61.6	266.3	1357.5	30.1	3.3
520	..PNEUMONIA	11	19.8	14.0	15.8	.	11.4	.	52.2	.	61.6	133.2	1357.5	21.6	2.5
470	..ALL OTH CBV DS	8	14.4	.	.	.	11.4	.	.	.	61.6	266.3	1810.0	15.7	0.7
440	..INTRCRB HMRHG	3	5.4	.	.	.	.	.	26.1	.	61.6	133.2	.	8.4	1.5
450	..CERBRL THROMB	3	5.4	.	.	.	.	.	.	.	123.2	133.2	.	8.4	1.4
530	..INFLUENZA	3	5.4	.	.	.	.	.	26.1	38.9	.	133.2	.	8.5	14.1
830	HOMICIDE	9	16.2	14.0	.	23.7	34.2	36.7	.	.	.	.	.	16.2	3.8
540	CHRON PULMON DIS	8	14.4	.	.	.	.	.	52.2	77.8	184.7	133.2	.	23.6	2.5
580	..OTH CHRN PULMO	5	9.0	.	.	.	.	.	26.1	38.9	123.2	133.2	.	14.5	2.5
560	..EMPHYSEMA	3	5.4	.	.	.	.	.	26.1	38.9	61.6	.	.	9.1	4.8
640	NEPHRITIS, ET AL	7	12.6	14.0	.	.	11.4	36.7	.	38.9	61.6	133.2	.	16.6	4.6

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Billings Females (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
670	..RENAL FAIL,ETC	6	10.8	14.0	.	.	11.4	18.3	.	38.9	61.6	133.2	.	14.0	4.5
660	..CHRN GLMR/NEPH	1	1.8	.	.	.	.	18.3	.	.	.	.	.	2.6	5.1
630	CHOLEL/GALLBLDR	4	7.2	.	.	15.8	.	.	.	.	123.2	.	.	8.9	12.8
730	CONGEN ANOMALIES	4	7.2	56.2	.	.	.	.	.	.	.	.	.	4.4	0.8
090	SEPTICEMIA	3	5.4	.	.	.	.	.	26.1	77.8	.	.	.	9.1	3.8
140	ALL OTH INF/PARA	3	5.4	.	.	7.9	.	.	.	.	61.6	133.2	.	6.9	5.3
820	SUICIDE	3	5.4	.	.	7.9	11.4	18.3	.	.	.	.	.	5.9	1.0
030	TUBERCULOSIS	1	1.8	.	.	.	.	.	.	.	61.6	.	.	3.0	7.5
050	..OTHER TB	1	1.8	.	.	.	.	.	.	.	61.6	.	.	3.0	30.1
130	SYPHILIS	1	1.8	.	.	7.9	.	.	.	.	.	.	.	1.5	.
250	BENIGN NEO,OTHER	1	1.8	.	.	7.9	.	.	.	.	.	.	.	1.5	0.9
270	NUTRITION DEFICS	1	1.8	.	.	.	.	.	.	.	.	.	452.5	1.5	3.7
480	ATHEROSCLEROSIS	1	1.8	.	.	.	.	.	.	.	.	.	452.5	1.5	0.3
500	ACUTE BRONCHITIS	1	1.8	14.0	.	.	.	.	.	.	.	.	.	1.1	11.1
590	ULCER-STOM,DUOD	1	1.8	.	.	.	.	.	.	38.9	.	.	.	3.1	2.6
610	HERNIA/INTST.OBS	1	1.8	14.0	.	.	.	.	.	.	.	.	.	1.1	0.9
770	SYMP/SIGN/ILL-DF	13	23.4	126.4	.	7.9	.	.	.	.	61.6	.	905.0	17.5	2.5
840	ALL OTH EXTRNL C	2	3.6	.	.	.	11.4	18.3	.	.	.	.	.	4.4	4.9
780	ALL OTHER DISEAS	49	88.1	14.0	7.9	15.8	79.8	183.5	208.9	233.5	246.3	798.9	1810.0	119.1	4.2

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

BILLINGS MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	616	1127.0	502.0	93.0	686.9	775.7	1259.7	2162.3	3891.5	5570.5	10789.0	15923.6	1539.4	2.0
790	ACCIDENTS/ADVERS	168	307.4	97.6	54.2	442.1	405.8	445.7	393.1	311.0	604.0	805.2	.	354.5	5.9
800	..MOTOR VEHICLE	103	188.4	13.9	31.0	363.2	238.7	251.9	196.6	196.5	201.3	644.1	.	204.7	6.3
810	..ALL OTH ACCDNT	65	118.9	83.7	23.2	79.0	167.1	193.8	196.6	314.5	402.7	161.0	.	149.8	5.4
310	DISEASE OF HEART	119	217.7	13.9	.	.	35.8	96.9	449.3	1257.9	1610.7	4025.8	8280.3	340.3	1.3
350	..ISCHMC HRT DIS	75	137.2	.	.	.	11.9	19.4	365.1	786.2	1208.1	2415.5	4458.6	221.1	1.1
360	....ACUT MYO INF	53	97.0	.	.	.	11.9	19.4	280.8	589.6	939.6	1449.3	1910.8	160.0	1.3
390	....OLD MI,OTHER	22	40.3	.	.	.	.	.	84.2	196.5	268.5	966.2	2547.8	61.0	0.7
410	..ALL OTH HRT DS	40	73.2	13.9	.	.	23.9	58.1	84.2	393.1	335.6	1610.3	3821.7	106.9	2.0
320	..RHEUM FEVER	3	5.5	.	.	.	.	19.4	.	78.6	.	.	.	9.1	5.1
400	..OTH ENDOCRD DS	1	1.8	.	.	.	.	.	.	.	67.1	.	.	3.2	1.3
150	MALIG NEOPLASMS	51	93.3	.	7.7	7.9	.	19.4	196.6	668.2	872.5	1610.3	636.9	153.6	0.9
180	..MAL NEO-RESPIR	16	29.3	.	.	.	.	.	84.2	157.2	335.6	483.1	636.9	48.5	0.8
170	..MAL NEO-DIGEST	12	22.0	.	.	.	.	.	56.2	235.8	134.2	322.1	.	37.8	0.9
220	..MAL NEO-OTHER	11	20.1	.	7.7	7.9	.	.	28.1	117.9	201.3	322.1	.	30.7	1.5
200	..MAL NEO-GENITL	4	7.3	.	.	.	.	.	28.1	.	134.2	161.0	.	12.5	0.8
210	..MAL NEO-URINAR	3	5.5	.	.	.	.	.	.	78.6	.	161.0	.	9.1	1.1
240	..OTH NEOP LYMPH	3	5.5	.	.	.	.	.	.	39.3	67.1	161.0	.	9.1	1.1
230	..LEUKEMIA	2	3.7	.	.	.	.	19.4	.	39.3	.	.	.	5.9	0.9
620	LIVER DIS/CIRRHS	40	73.2	.	.	.	83.5	232.6	280.8	353.8	134.2	.	.	114.8	7.2
820	SUICIDE	29	53.1	.	.	94.7	59.7	135.7	28.1	117.9	67.1	.	.	61.6	3.4
830	HOMICIDE	29	53.1	.	7.7	102.6	83.5	77.5	112.3	.	.	.	.	57.4	3.4
430	CEREBROVASC DS	20	36.6	.	.	.	.	.	56.2	117.9	469.8	966.2	1273.9	57.8	1.4
440	..INTRCRB HMRRG	8	14.6	.	.	.	.	.	28.1	117.9	201.3	161.0	.	25.3	3.9
470	..ALL OTH CBV DS	8	14.6	.	.	.	.	.	28.1	.	134.2	644.1	636.9	21.9	0.8
450	..CEREBL THROMB	4	7.3	.	.	.	.	.	.	.	134.2	161.0	636.9	10.6	1.4
510	PNEUMONIA/INFLNZ	15	27.4	.	.	.	.	.	56.2	78.6	268.5	644.1	1910.8	41.2	2.5
520	..PNEUMONIA	14	25.6	.	.	.	.	.	56.2	78.6	268.5	644.1	1273.9	39.7	2.5
530	..INFLUENZA	1	1.8	.	.	.	.	.	.	.	.	.	636.9	1.5	2.5
540	CHRON PULMON DIS	11	20.1	.	.	.	.	.	.	78.6	201.3	966.2	.	31.9	1.2
580	..OTH CHRN PULMO	7	12.8	.	.	.	.	.	.	78.6	134.2	483.1	.	20.8	1.2
550	..BRONCH,CHRON	2	3.7	.	.	.	.	.	.	.	.	322.1	.	5.3	3.5
560	..EMPHYSEMA	2	3.7	.	.	.	.	.	.	.	67.1	161.0	.	5.9	0.9
260	DIABETES MELLITU	9	16.5	.	.	.	11.9	19.4	28.1	78.6	67.1	483.1	.	25.5	2.6
090	SEPTICEMIA	7	12.8	.	.	.	.	58.1	.	39.3	201.3	.	.	20.9	6.2
740	PERINATAL CONDIT	7	12.8	97.6	.	.	.	.	.	.	.	.	.	7.9	0.8
760	..OTH COND PERIN	6	11.0	83.7	.	.	.	.	.	.	.	.	.	6.8	1.0
750	..BIRTH TRAUMA	1	1.8	13.9	.	.	.	.	.	.	.	.	.	1.1	0.3
140	ALL OTH INF/PARA	5	9.1	13.9	.	.	11.9	.	28.1	39.3	.	161.0	.	12.3	7.2
640	NEPHRITIS, ET AL	5	9.1	13.9	.	.	11.9	19.4	.	.	67.1	161.0	.	11.6	2.1

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Billings Males (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
670	..RENAL FAIL,ETC	5	9.1	13.9	.	.	11.9	19.4	.	.	67.1	161.0	.	11.6	2.4
030	TUBERCULOSIS	4	7.3	.	.	.	.	.	28.1	39.3	67.1	161.0	.	12.5	12.5
730	CONGEN ANOMALIES	4	7.3	55.8	.	.	.	.	.	.	.	.	.	4.5	0.7
040	..TB-RESPIRATORY	3	5.5	.	.	.	.	.	28.1	39.3	.	161.0	.	9.2	11.5
050	..OTHER TB	1	1.8	.	.	.	.	.	.	.	67.1	.	.	3.2	32.2
480	ATHEROSCLEROSIS	3	5.5	.	.	.	.	.	28.1	39.3	.	161.0	.	9.2	1.5
490	OTHER ARTERY DIS	3	5.5	.	.	.	11.9	.	28.1	39.3	.	.	.	8.5	1.0
420	..HYPRTNS+/- RNL	2	3.7	.	.	.	.	.	28.1	.	67.1	.	.	6.6	3.0
500	ACUTE BRONCHITIS	2	3.7	27.9	.	.	.	.	.	.	.	.	.	2.3	11.3
590	ULCER-STOM,DUOD	2	3.7	.	.	.	.	.	28.1	.	67.1	.	.	6.6	2.9
610	HERNIA/INTST.OBS	2	3.7	.	.	.	.	.	.	39.3	.	.	636.9	4.7	3.6
120	VIRAL HEPATITIS	1	1.8	13.9	.	.	.	.	.	.	.	.	.	1.1	2.8
250	BENIGN NEO,OTHER	1	1.8	.	.	.	.	.	.	.	67.1	.	.	3.2	1.5
270	NUTRITION DEFICS	1	1.8	.	.	.	.	.	.	.	67.1	.	.	3.2	6.4
630	CHOLEL/GALLBLDR	1	1.8	.	.	.	.	.	.	.	67.1	.	.	3.2	4.0
680	KIDNEY INFECTION	1	1.8	.	.	.	.	.	.	.	67.1	.	.	3.2	6.4
770	SYMP/SIGN/ILL-DF	16	29.3	139.4	.	.	.	.	.	117.9	67.1	161.0	636.9	28.3	2.2
840	ALL OTH EXTRNL C	1	1.8	.	.	.	.	.	.	.	67.1	.	.	3.2	1.5
780	ALL OTHER DISEAS	57	104.3	27.9	23.2	39.5	59.7	155.0	393.1	275.2	402.7	483.1	2547.8	147.6	3.5

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

NASHVILLE BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	557	678.9	516.1	55.1	337.4	202.8	399.7	1032.9	1597.3	3473.8	6843.8	10215.1	765.4	1.3
310	DISEASE OF HEART	155	188.9	26.5	.	5.6	21.0	94.7	295.1	571.9	1318.8	2898.6	3763.4	224.8	1.2
350	..ISCHMC HRT DIS	101	123.1	.	.	.	7.0	52.6	206.6	374.7	1029.3	2093.4	1075.3	151.9	1.1
360	....ACUT MYO INF	67	81.7	.	.	.	.	10.5	177.1	295.8	611.1	1288.2	1075.3	100.9	1.2
390	....OLD MI,OTHER	32	39.0	.	.	.	7.0	31.6	29.5	78.9	386.0	805.2	.	48.0	0.8
370	....OTH ACUT IHD	2	2.4	.	.	.	.	10.5	.	.	32.2	.	.	3.0	2.3
410	..ALL OTH HRT DS	42	51.2	26.5	.	5.6	7.0	31.6	44.3	157.8	193.0	644.1	2688.2	54.5	1.3
330	..HYPRTNS HRT DS	7	8.5	.	.	.	.	.	14.8	19.7	96.5	161.0	.	10.8	1.9
320	..RHEUM FEVER	2	2.4	.	.	.	.	10.5	.	19.7	.	.	.	3.0	1.3
400	..OTH ENDOCRD DS	2	2.4	.	.	.	7.0	.	14.8	.	.	.	.	2.9	1.4
340	..HYPRTNS+RENAL	1	1.2	.	.	.	.	.	14.8	.	.	.	.	1.7	2.2
130	MALIG NEOPLASMS	84	102.4	.	.	.	21.0	73.6	265.6	295.8	675.5	1207.7	1344.1	126.0	1.0
170	..MAL NEO-DIGEST	26	31.7	.	.	.	7.0	21.0	88.5	78.9	128.7	483.1	806.5	37.6	1.2
180	..MAL NEO-RESPIR	16	19.5	.	.	.	.	.	44.3	78.9	128.7	402.6	.	24.7	0.7
200	..MAL NEO-GENITL	10	12.2	.	.	.	.	21.0	14.8	19.7	128.7	80.5	268.8	14.6	1.1
190	..MAL NEO-BREAST	7	8.5	.	.	.	.	10.5	44.3	39.4	32.2	.	.	11.4	0.9
220	..MAL NEO-OTHER	7	8.5	.	.	.	.	10.5	29.5	.	64.3	161.0	.	10.8	0.6
230	..LEUKEMIA	6	7.3	.	.	.	7.0	.	.	78.9	32.2	.	.	9.0	1.8
210	..MAL NEO-URINAR	5	6.1	.	.	.	7.0	.	29.5	.	64.3	.	.	7.7	1.5
240	..OTH NEOP LYMPH	4	4.9	.	.	.	.	.	14.8	.	64.3	.	268.8	5.6	0.8
160	..MAL NEOPLS-LIP	3	3.7	.	.	.	.	10.5	.	.	32.2	80.5	.	4.4	1.6
790	ACCIDENTS/ADVERS	74	90.2	52.9	24.5	163.1	83.9	73.6	103.3	118.3	64.3	241.5	.	90.9	2.3
800	..MOTOR VEHICLE	42	51.2	26.5	18.4	118.1	62.9	10.5	29.5	78.9	.	.	.	48.2	2.2
810	..ALL OTH ACCDNT	32	39.0	26.5	6.1	45.0	21.0	63.1	73.8	39.4	64.3	241.5	.	42.7	2.4
430	CEREBROVASC DS	38	46.3	.	.	.	14.0	21.0	59.0	118.3	193.0	966.2	1612.9	52.2	1.4
470	..ALL OTH CBV DS	25	30.5	.	.	.	7.0	21.0	44.3	98.6	96.5	563.6	1075.3	34.6	1.4
450	..CERBRL THROMB	9	11.0	.	.	.	.	.	14.8	.	64.3	322.1	537.6	11.9	1.8
440	..INTRCRB HMRHG	4	4.9	.	.	.	7.0	.	.	19.7	32.2	80.5	.	5.7	0.9
260	DIABETES MELLITU	27	32.9	.	.	.	.	10.5	88.5	118.3	193.0	402.6	806.5	39.9	4.1
510	PNEUMONIA/INFLNZ	20	24.4	13.2	.	.	.	10.5	14.8	59.2	128.7	402.6	1344.1	25.9	2.1
520	..PNEUMONIA	16	19.5	13.2	.	.	.	10.5	14.8	59.2	128.7	241.5	806.5	21.7	1.9
530	..INFLUENZA	4	4.9	.	.	.	.	.	.	.	.	161.0	537.6	4.3	7.1
620	LIVER DIS/CIRRHS	19	23.2	.	.	.	.	31.6	103.3	138.0	64.3	.	.	30.8	2.7
830	HOMICIDE	19	23.2	.	6.1	39.4	48.9	10.5	14.8	39.4	.	.	.	22.5	2.2
820	SUICIDE	16	19.5	.	.	98.7	.	10.5	.	19.7	.	.	.	17.4	1.5
740	PERINATAL CONDIT	13	15.8	172.0	.	.	.	.	.	.	.	.	.	13.8	1.5
760	..OTH COND PERIN	9	11.0	119.1	.	.	.	.	.	.	.	.	.	9.5	1.5
750	..BIRTH TRAUMA	4	4.9	32.9	.	.	.	.	.	.	.	.	.	4.2	1.5
730	CONGEN ANOMALIES	5	6.1	39.7	.	11.2	.	.	.	.	.	.	.	5.2	0.9

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Nashville Both Sexes (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
640	NEPHRITIS, ET AL	4	4.9	.	.	.	.	.	.	.	96.5	.	268.8	5.4	1.2
670	..RENAL FAIL,ETC	3	3.7	.	.	.	.	.	.	.	64.3	.	268.8	3.9	1.0
660	..CHRN GLMR/NEPH	1	1.2	.	.	.	.	.	.	.	32.2	.	.	1.6	3.1
090	SEPTICEMIA	3	3.7	13.2	.	.	.	.	.	.	64.3	.	.	4.2	1.4
250	BENIGN NEO,OTHER	3	3.7	13.2	.	.	.	.	.	.	.	161.0	.	3.8	2.0
490	OTHER ARTERY DIS	3	3.7	.	.	.	7.0	.	.	.	32.2	80.5	.	4.1	0.8
340	CHRON PULMON DIS	3	3.7	.	.	.	.	.	.	.	96.5	.	.	4.7	0.3
550	..BRONCH,CHRON	1	1.2	.	.	.	.	.	.	.	32.2	.	.	1.6	1.6
570	..ASTHMA	1	1.2	.	.	.	.	.	.	.	32.2	.	.	1.6	1.6
580	..OTH CHRN PULMO	1	1.2	.	.	.	.	.	.	.	32.2	.	.	1.6	0.1
020	OTH INTSTNL INFS	1	1.2	13.2	.	.	.	.	.	.	.	.	.	1.1	10.6
030	TUBERCULOSIS	1	1.2	.	.	.	.	.	.	.	.	80.5	.	1.4	2.3
040	..TB-RESPIRATORY	1	1.2	.	.	.	.	.	.	.	.	80.5	.	1.4	2.8
270	NUTRITION DEFICS	1	1.2	.	.	.	.	.	.	.	.	80.5	.	1.4	2.8
290	MENINGITIS	1	1.2	13.2	.	.	.	.	.	.	.	.	.	1.1	2.1
480	ATHEROSCLEROSIS	1	1.2	.	.	.	.	.	.	.	.	.	268.8	0.7	0.1
590	ULCER-STOM,DUOD	1	1.2	.	.	.	.	.	14.8	.	.	.	.	1.7	1.0
770	SYMP/SIGN/ILL-DF	16	19.5	92.6	12.2	.	.	10.5	.	19.7	128.7	.	268.8	19.5	2.0
780	ALL OTHER DISEAS	45	54.8	66.2	12.2	16.9	7.0	52.6	73.8	98.6	418.1	322.1	537.6	62.8	1.8
840	ALL OTH EXTRNL C	4	4.9	.	.	22.5	.	.	.	.	.	.	.	4.1	2.7

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

NASHVILLE FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	223	539.0	351.6	62.4	114.1	97.8	228.0	798.2	1248.6	2946.2	6162.5	8920.2	582.5	1.4
310	DISEASE OF HEART	66	159.5	.	.	.	.	41.5	199.5	440.7	963.2	2801.1	3755.9	173.7	1.3
350	..ISCHMC HRT DIS	40	96.7	.	.	.	.	.	114.0	220.3	736.5	2100.8	939.0	107.6	1.1
360	....ACUT MYO INF	25	60.4	.	.	.	.	.	114.0	183.6	283.3	1260.5	939.0	67.3	1.3
390	....OLD MI,OTHER	15	36.3	.	.	.	.	.	.	36.7	453.3	840.3	.	40.3	0.9
410	..ALL OTH HRT DS	21	50.8	.	.	.	.	20.7	57.0	183.6	170.0	560.2	2816.9	51.7	1.7
320	..RHEUM FEVER	2	4.8	.	.	.	.	20.7	.	36.7	.	.	.	5.8	2.1
330	..HYPRTNS HRT DS	2	4.8	.	.	.	.	.	.	.	56.7	140.1	.	5.3	1.0
340	..HYPRTNS+RENAL	1	2.4	.	.	.	.	.	28.5	.	.	.	.	3.3	4.7
150	MALIG NEOPLASMS	41	99.1	.	.	.	.	124.4	285.1	367.2	396.6	840.3	939.0	116.8	1.1
170	..MAL NEO-DIGEST	11	26.6	.	.	.	.	41.5	57.0	36.7	113.3	420.2	469.5	29.9	1.2
190	..MAL NEO-BREAST	7	16.9	.	.	.	.	20.7	85.5	73.4	56.7	.	.	21.3	0.9
180	..MAL NEO-RESPIR	6	14.5	.	.	.	.	.	28.5	110.2	.	280.1	.	17.0	0.9
200	..MAL NEO-GENITL	5	12.1	.	.	.	.	41.5	28.5	36.7	56.7	.	.	14.7	1.1
210	..MAL NEO-URINAR	3	7.3	.	.	.	.	.	57.0	.	56.7	.	.	9.3	3.1
220	..MAL NEO-OTHER	3	7.3	.	.	.	.	20.7	.	.	56.7	140.1	.	8.2	0.6
230	..LEUKEMIA	3	7.3	.	.	.	.	.	.	110.2	.	.	.	8.7	2.2
240	..OTH NEOP LYMPH	2	4.8	.	.	.	.	.	28.5	.	.	.	469.5	4.8	0.9
140	..MAL NEOPLS-LIP	1	2.4	.	.	.	.	.	.	.	56.7	.	.	2.8	1.8
430	CEREBROVASC DS	19	45.9	.	.	.	27.9	41.5	28.5	73.4	113.3	840.3	1877.9	46.4	1.3
470	..ALL OTH CBV DS	12	29.0	.	.	.	14.0	41.5	28.5	36.7	56.7	420.2	1408.5	29.3	1.2
450	..CERBRL THROMB	4	9.7	.	.	.	.	.	.	.	.	420.2	469.5	9.2	1.5
440	..INTRCRB HMRHG	3	7.3	.	.	.	14.0	.	.	36.7	56.7	.	.	8.0	1.4
280	DIABETES MELLITU	13	31.4	.	.	.	.	.	85.5	.	226.6	560.2	939.0	34.2	3.6
780	ACCIDENTS/ADVERS	12	29.0	27.0	25.0	68.5	27.9	.	.	36.7	.	.	.	26.4	1.3
800	..MOTOR VEHICLE	10	24.2	27.0	25.0	45.6	27.9	.	.	36.7	.	.	.	22.2	2.0
810	..ALL OTH ACCDNT	2	4.8	.	.	22.8	.	.	.	.	.	.	.	4.2	0.5
510	PNEUMONIA/INFLNZ	9	21.8	27.0	.	.	.	.	.	36.7	170.0	420.2	469.5	22.5	2.4
520	..PNEUMONIA	6	14.5	27.0	.	.	.	.	.	36.7	170.0	140.1	.	15.9	1.8
530	..INFLUENZA	3	7.3	.	.	.	.	.	.	.	.	280.1	469.5	6.6	11.0
620	LIVER DIS/CIRRHS	7	16.9	.	.	.	.	.	85.5	110.2	56.7	.	.	21.3	2.9
830	HOMICIDE	5	12.1	.	.	.	41.9	.	28.5	36.7	.	.	.	13.1	3.0
640	NEPHRITIS, ET AL	3	7.3	.	.	.	.	.	.	.	113.3	.	469.5	7.1	2.0
730	CONGEN ANOMALIES	3	7.3	81.1	.	.	.	.	.	.	.	.	.	6.4	1.2
740	PERINATAL CONDIT	3	7.3	81.1	.	.	.	.	.	.	.	.	.	6.4	0.8
750	..OTH COND PERIN	3	7.3	81.1	.	.	.	.	.	.	.	.	.	6.4	1.1
670	..RENAL FAIL,ETC	2	4.8	.	.	.	.	.	.	.	56.7	.	469.5	4.3	1.4
660	..CHRN GLMR/NEPH	1	2.4	.	.	.	.	.	.	.	56.7	.	.	2.8	5.5
820	SUICIDE	2	4.8	.	.	22.8	.	.	.	.	.	.	.	4.2	0.7
090	SEPTICEMIA	1	2.4	.	.	.	.	.	.	.	56.7	.	.	2.8	1.2
250	BENIGN NEO,OTHER	1	2.4	.	.	.	.	.	.	.	.	140.1	.	2.5	1.5

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Nashville Females (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
270	NUTRITION DEFICS	1	2.4	.	.	.	.	.	.	.	.	140.1	.	2.5	6.3
290	MENINGITIS	1	2.4	27.0	.	.	.	.	.	.	.	.	.	2.1	5.3
490	OTHER ARTERY DIS	1	2.4	.	.	.	.	.	.	.	56.7	.	.	2.8	0.9
540	CHRON PULMON DIS	1	2.4	.	.	.	.	.	.	.	56.7	.	.	2.8	0.3
570	..ASTHMA	1	2.4	.	.	.	.	.	.	.	56.7	.	.	2.8	2.5
770	SYMP/SIGN/ILL-DF	7	16.9	54.1	25.0	.	.	.	.	.	170.0	.	.	15.8	2.4
840	ALL OTH EXTRNL C	1	2.4	.	.	11.4	.	.	.	.	.	.	.	2.1	2.3
780	ALL OTHER DISEAS	26	62.8	54.1	12.5	11.4	.	20.7	85.5	146.9	566.6	420.2	469.5	69.6	2.5

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

NASHVILLE MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	334	821.2	673.7	48.1	554.4	308.0	576.3	1284.8	2000.9	4166.7	7765.2	11949.7	965.6	1.3
310	DISEASE OF HEART	89	218.8	51.8	.	11.1	42.0	149.4	397.7	723.7	1785.7	3030.3	3773.6	285.0	1.1
350	..ISCHMC HRT DIS	61	150.0	.	.	.	14.0	106.7	305.9	553.4	1413.7	2083.3	1257.9	204.1	1.0
360	....ACUT MYO INF	42	103.3	.	.	.	.	21.3	244.7	425.7	1041.7	1325.8	1257.9	142.0	1.2
390	....OLD MI,OTHER	17	41.8	.	.	.	14.0	64.0	61.2	127.7	297.6	757.6	.	55.6	0.7
370	....OTH ACUT IHD	2	4.9	.	.	.	.	21.3	.	.	74.4	.	.	6.5	3.1
410	..ALL OTH HRT DS	21	51.6	51.8	.	11.1	14.0	42.7	30.6	127.7	223.2	757.6	2515.7	57.6	1.1
330	..HYPRTNS HRT DS	5	12.3	.	.	.	.	.	30.6	42.6	148.8	189.4	.	17.4	2.7
400	..OTH ENDOCRD DS	2	4.9	.	.	.	14.0	.	30.6	.	.	.	.	5.9	2.4
790	ACCIDENTS/ADVERS	62	152.4	77.7	24.0	255.0	140.0	149.4	214.1	212.9	148.8	568.2	.	159.0	2.6
800	..MOTOR VEHICLE	32	78.7	25.9	12.0	188.5	98.0	21.3	61.2	127.7	.	.	.	74.4	2.3
810	..ALL OTH ACCDNT	30	73.8	51.8	12.0	66.5	42.0	128.1	153.0	85.1	148.8	568.2	.	84.5	3.1
150	MALIG NEOPLASMS	43	105.7	.	.	.	42.0	21.3	244.7	212.9	1041.7	1704.5	1886.8	138.9	0.8
170	..MAL NEO-DIGEST	15	36.9	.	.	.	14.0	.	122.4	127.7	148.8	568.2	1257.9	46.9	1.1
180	..MAL NEO-RESPIR	10	24.6	.	.	.	.	.	61.2	42.6	297.6	568.2	.	34.4	0.6
200	..MAL NEO-GENITL	5	12.3	.	.	.	.	.	.	.	223.2	189.4	628.9	15.3	1.0
220	..MAL NEO-OTHER	4	9.8	.	.	.	.	.	61.2	.	74.4	189.4	.	14.0	0.7
230	..LEUKEMIA	3	7.4	.	.	.	14.0	.	.	42.6	74.4	.	.	9.3	1.4
160	..MAL NEOPLS-LIP	2	4.9	.	.	.	.	21.3	.	.	.	189.4	.	6.1	1.3
210	..MAL NEO-URINAR	2	4.9	.	.	.	14.0	.	.	.	74.4	.	.	5.8	0.7
240	..OTH NEOP LYMPH	2	4.9	.	.	.	.	.	.	.	148.8	.	.	7.1	0.9
430	CEREBROVASC DS	19	46.7	.	.	.	.	.	91.8	170.3	297.6	1136.4	1257.9	60.9	1.5
470	..ALL OTH CBV DS	13	32.0	.	.	.	.	.	61.2	170.3	148.8	757.6	628.9	42.4	1.5
450	..CERBRL THROMB	5	12.3	.	.	.	.	.	30.6	.	148.8	189.4	628.9	15.4	2.1
440	..INTRCRB HMRHG	1	2.5	.	.	.	.	.	.	.	.	189.4	.	3.1	0.5
260	DIABETES MELLITU	14	34.4	.	.	.	.	21.3	91.8	255.4	148.8	189.4	628.9	46.7	4.7
820	SUICIDE	14	34.4	.	.	133.1	.	21.3	.	42.6	.	.	.	30.4	1.7
830	HOMICIDE	14	34.4	.	12.0	77.6	56.0	21.3	.	42.6	.	.	.	31.4	1.9
620	LIVER DIS/CIRRHS	12	29.5	.	.	.	.	64.0	122.4	170.3	74.4	.	.	41.1	2.6
510	PNEUMONIA/INFLNZ	11	27.0	.	.	.	.	21.3	30.6	85.1	74.4	378.8	2515.7	29.4	1.8
520	..PNEUMONIA	10	24.6	.	.	.	.	21.3	30.6	85.1	74.4	378.8	1886.8	27.9	1.7
530	..INFLUENZA	1	2.5	.	.	.	.	.	.	.	.	.	628.9	1.5	2.5
740	PERINATAL CONDIT	10	24.6	259.1	.	.	.	.	.	.	.	.	.	21.0	2.0
760	..OTH COND PERIN	6	14.8	155.5	.	.	.	.	.	.	.	.	.	12.6	1.8
750	..BIRTH TRAUMA	4	9.8	103.7	.	.	.	.	.	.	.	.	.	8.4	2.5
090	SEPTICEMIA	2	4.9	25.9	.	.	.	.	.	.	74.4	.	.	5.7	1.7
250	BENIGN NEO,OTHER	2	4.9	25.9	.	.	.	.	.	.	.	189.4	.	5.2	2.5
490	OTHER ARTERY DIS	2	4.9	.	.	.	14.0	.	.	.	.	189.4	.	5.3	0.6
540	CHRON PULMON DIS	2	4.9	.	.	.	.	.	.	.	148.8	.	.	7.1	0.3

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Nashville Males (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
730	CONGEN ANOMALIES	2	4.9	.	.	22.2	.	.	.	.	.	.	.	4.0	0.7
550	..BRONCH,CHRON	1	2.5	.	.	.	.	.	.	.	74.4	.	.	3.6	2.4
580	..OTH CHRN PULMO	1	2.5	.	.	.	.	.	.	.	74.4	.	.	3.6	0.2
020	OTH INTSTNL INFS	1	2.5	25.9	.	.	.	.	.	.	.	.	.	2.1	21.0
030	TUBERCULOSIS	1	2.5	.	.	.	.	.	.	.	.	189.4	.	3.1	3.1
040	..TB-RESPIRATORY	1	2.5	.	.	.	.	.	.	.	.	189.4	.	3.1	3.9
480	ATHEROSCLEROSIS	1	2.5	.	.	.	.	.	.	.	.	.	628.9	1.5	0.3
590	ULCER-STOM,DUOD	1	2.5	.	.	.	.	.	30.6	.	.	.	.	3.7	1.6
640	NEPHRITIS, ET AL	1	2.5	.	.	.	.	.	.	.	74.4	.	.	3.6	0.6
670	..RENAL FAIL,ETC	1	2.5	.	.	.	.	.	.	.	74.4	.	.	3.6	0.7
770	SYMP/SIGN/ILL-DF	9	22.1	120.6	.	.	.	21.3	.	42.6	74.4	.	628.9	22.0	1.7
840	ALL OTH EXTRNL C	3	7.4	.	.	33.3	.	.	.	.	.	.	.	6.0	2.7
780	ALL OTHER DISEAS	19	46.7	77.7	12.0	22.2	14.0	85.4	61.2	42.6	223.2	189.4	628.9	52.6	1.2

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

NAVAJO BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	2414	539.2	427.4	53.4	299.7	416.1	487.3	756.0	1192.2	2201.4	5386.5	13958.1	656.3	1.2
790	ACCIDENTS/ADVERS	645	144.1	58.4	30.4	183.0	215.7	196.4	209.6	187.4	257.6	393.7	448.7	165.7	4.2
800	..MOTOR VEHICLE	404	90.2	29.2	12.0	140.4	143.8	130.9	120.3	83.3	132.7	143.2	49.9	101.3	4.6
810	..ALL OTH ACCDNT	241	53.8	29.2	18.4	42.7	71.9	65.5	89.3	104.1	124.9	250.5	398.8	64.4	3.6
310	DISEASE OF HEART	263	58.7	32.6	1.8	3.8	7.6	17.0	68.7	166.6	437.2	1163.2	2642.1	77.3	0.4
410	..ALL OTH HRT DS	135	30.2	32.6	0.9	1.9	3.1	12.1	27.5	57.3	148.3	590.6	1744.8	35.4	0.9
350	..ISCHMC HRT DIS	102	22.8	.	.	.	.	2.4	34.4	88.5	265.4	447.4	747.8	34.2	0.2
360	....ACUT MYO INF	58	13.0	.	.	.	.	2.4	24.1	41.6	156.1	268.4	349.0	19.7	0.3
390	....OLD MI,OTHER	41	9.2	.	.	.	.	.	10.3	41.6	109.3	161.1	349.0	13.6	0.3
370	....OTH ACUT IHD	3	0.7	.	.	.	.	.	.	5.2	.	17.9	49.9	0.9	0.7
320	..RHEUM FEVER	12	2.7	.	0.9	1.9	3.1	.	3.4	20.8	7.8	17.9	.	3.8	1.6
400	..OTH ENDOCRD DS	8	1.8	.	.	.	1.5	2.4	3.4	.	7.8	35.8	99.7	2.3	1.1
330	..HYPRTNS HRT DS	5	1.1	.	.	.	.	.	.	.	7.8	71.6	.	1.6	0.3
340	..HYPRTNS+RENAL	1	0.2	.	.	.	.	.	.	.	.	.	49.9	0.1	0.2
150	MALIG NEOPLASMS	231	51.6	1.7	2.8	7.6	7.6	46.1	110.0	203.0	429.4	769.5	1296.1	76.6	0.8
170	..MAL NEO-DIGEST	97	21.7	.	.	0.9	.	21.8	48.1	88.5	179.5	429.5	448.7	33.4	1.0
220	..MAL NEO-OTHER	47	10.5	1.7	0.9	1.9	4.6	.	3.4	36.4	132.7	143.2	349.0	14.6	0.9
200	..MAL NEO-GENITL	31	6.9	.	.	2.8	1.5	7.3	13.7	31.2	46.8	35.8	299.1	9.6	0.7
180	..MAL NEO-RESPIR	16	3.6	.	.	.	.	2.4	17.2	10.4	23.4	71.6	49.9	5.7	0.2
190	..MAL NEO-BREAST	13	2.9	.	.	.	.	4.8	20.6	15.6	15.6	.	.	5.1	0.4
240	..OTH NEOP LYMPH	10	2.2	.	.	0.9	1.5	2.4	.	5.2	15.6	35.8	99.7	2.8	0.4
230	..LEUKEMIA	8	1.8	.	1.8	0.9	.	4.8	3.4	.	7.8	.	49.9	2.1	0.4
210	..MAL NEO-URINAR	7	1.6	.	.	.	.	2.4	3.4	15.6	7.8	17.9	.	2.7	0.5
160	..MAL NEOPLS-LIP	2	0.4	.	.	.	.	.	.	.	.	35.8	.	0.6	0.2
510	PNEUMONIA/INFLNZ	120	26.8	20.6	1.8	1.9	7.6	.	20.6	41.6	101.5	465.3	2293.1	28.6	2.3
520	..PNEUMONIA	114	25.5	18.9	1.8	1.9	7.6	.	20.6	41.6	93.7	447.4	2143.6	27.4	2.4
530	..INFLUENZA	6	1.3	1.7	.	.	.	.	.	.	7.8	17.9	149.6	1.2	2.1
620	LIVER DIS/CIRRHS	63	14.1	.	.	.	24.5	43.6	41.2	41.6	39.0	71.6	.	21.4	1.9
430	CEREBROVASC DS	62	13.8	1.7	.	.	.	2.4	13.7	36.4	62.5	357.9	1046.9	17.1	0.4
470	..ALL OTH CBV DS	48	10.7	.	.	.	.	2.4	3.4	15.6	54.6	322.1	897.3	12.7	0.5
440	..INTRCRB HMRHG	12	2.7	.	.	.	.	.	10.3	20.8	7.8	35.8	99.7	4.2	0.7
450	..CERBRL THROMB	2	0.4	1.7	.	.	.	.	.	.	.	.	49.9	0.3	0.0
830	HOMICIDE	59	13.2	.	0.9	23.7	15.3	29.1	17.2	15.6	15.6	.	.	15.0	1.4
730	CONGEN ANOMALIES	58	13.0	87.5	0.9	1.9	4.6	.	.	.	.	.	49.9	8.4	1.4
820	SUICIDE	53	11.8	.	0.9	23.7	27.5	9.7	17.2	.	.	.	.	12.3	1.1
640	NEPHRITIS, ET AL	44	9.8	1.7	.	4.7	4.6	12.1	13.7	41.6	39.0	107.4	349.0	13.1	2.9
670	..RENAL FAIL,ETC	39	8.7	1.7	.	2.8	3.1	12.1	10.3	41.6	31.2	107.4	349.0	11.7	3.1
660	..CHRN GLMR/NEPH	5	1.1	.	.	1.9	1.5	.	3.4	.	7.8	.	.	1.4	2.8
260	DIABETES MELLITU	41	9.2	.	.	.	3.1	2.4	20.6	52.1	78.1	125.3	249.3	14.1	1.4
740	PERINATAL CONDIT	40	8.9	65.2	.	.	.	.	.	.	.	.	.	5.2	0.6

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Navajo Both Sexes (cont'd)

CODE[1]	CAUSE[2]	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
760	..OTH COND PERIN	25	5.6	39.5	.	.	.	.	.	.	.	.	.	3.2	0.5
750	..BIRTH TRAUMA	15	3.4	25.7	.	.	.	.	.	.	.	.	.	2.1	0.7
090	SEPTICEMIA	18	4.0	8.6	.	.	1.5	.	.	20.8	31.2	35.8	99.7	5.0	1.7
140	ALL OTH INF/PARA	16	3.6	3.4	1.8	.	3.1	2.4	6.9	.	.	71.6	149.6	3.9	2.6
540	CHRON PULMON DIS	15	3.4	1.7	.	.	.	.	6.9	20.8	15.6	35.8	199.4	4.5	0.3
630	CHOLEL/GALLBLDR	15	3.4	.	.	.	.	.	3.4	15.6	7.8	107.4	199.4	4.4	6.4
580	..OTH CHRN PULMO	9	2.0	.	.	.	.	.	3.4	15.6	7.8	17.9	149.6	2.8	0.3
570	..ASTHMA	3	0.7	.	.	.	.	.	.	5.2	.	17.9	49.9	0.9	0.9
550	..BRONCH,CHRON	2	0.4	1.7	.	.	.	.	3.4	.	.	.	.	0.5	0.5
560	..EMPHYSEMA	1	0.2	.	.	.	.	.	.	.	7.8	.	.	0.4	0.1
030	TUBERCULOSIS	14	3.1	.	.	.	.	2.4	6.9	10.4	.	89.5	199.4	4.1	6.8
040	..TB-RESPIRATORY	11	2.5	.	.	.	.	.	3.4	10.4	.	71.6	199.4	3.0	6.1
050	..OTHER TB	3	0.7	.	.	.	.	2.4	3.4	.	.	17.9	.	1.1	10.5
270	NUTRITION DEFICS	12	2.7	.	.	.	.	.	.	5.2	7.8	71.6	299.1	2.9	5.7
290	MENINGITIS	12	2.7	15.4	.	.	.	.	.	.	.	53.7	.	2.2	4.3
420	..HYPRTNS+/- RNL	9	2.0	.	.	.	.	2.4	3.4	26.0	7.8	17.9	.	3.5	1.9
490	OTHER ARTERY DIS	6	1.3	.	.	.	.	.	6.9	5.2	7.8	17.9	49.9	2.1	0.4
250	BENIGN NEO,OTHER	5	1.1	.	.	.	.	2.4	6.9	.	7.8	17.9	.	1.8	1.0
480	ATHEROSCLEROSIS	4	0.9	.	.	.	.	.	.	.	7.8	.	149.6	0.8	0.2
080	MENINGOCOCCL INF	3	0.7	5.1	.	.	.	.	.	.	.	.	.	0.4	2.1
280	ANEMIAS	2	0.4	.	.	.	.	.	.	.	.	.	99.7	0.3	0.3
610	HERNIA/INTST.OBS	2	0.4	.	.	.	.	.	.	.	.	35.8	.	0.6	0.5
700	PREGNANCY COMPLI	2	0.4	.	.	0.9	.	2.4	.	.	.	.	.	0.5	5.1
720	..OTH PREG COMPL	2	0.4	.	.	0.9	.	2.4	.	.	.	.	.	0.5	5.1
120	VIRAL HEPATITIS	1	0.2	1.7	.	.	.	.	.	.	.	.	.	0.1	0.5
500	ACUTE BRONCHITIS	1	0.2	1.7	.	.	.	.	.	.	.	.	.	0.1	0.7
590	ULCER-STOM,DUOD	1	0.2	.	.	.	.	.	.	.	.	17.9	.	0.3	0.2
770	SYMP/SIGN/ILL-DF	288	64.3	48.1	8.3	26.6	30.6	31.5	82.5	161.4	382.5	823.2	1944.2	80.3	8.2
840	ALL OTH EXTRNL C	25	5.6	1.7	0.9	3.8	9.2	9.7	6.9	15.6	23.4	17.9	.	7.3	4.9
780	ALL OTHER DISEAS	284	63.4	70.4	2.8	18.0	53.5	75.2	92.8	124.9	242.0	519.0	2193.4	76.3	2.2

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

NAVAJO FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	900	390.1	351.3	46.0	117.6	180.0	280.0	576.9	948.3	1731.8	5143.9	12758.0	487.0	1.2
790	ACCIDENTS/ADVERS	149	64.6	41.3	29.5	66.1	91.5	76.8	75.2	67.7	88.8	323.7	281.4	71.3	3.5
800	..MOTOR VEHICLE	106	45.9	20.7	11.0	62.5	70.8	72.3	50.2	48.4	59.2	107.9	.	51.2	4.5
810	..ALL OTH ACCDNT	43	18.6	20.7	18.4	3.7	20.7	4.5	25.1	19.4	29.6	215.8	281.4	20.1	2.2
150	MALIG NEOPLASMS	132	57.2	3.4	3.7	5.5	8.9	63.2	125.4	261.3	429.2	755.4	1125.7	85.6	0.8
170	..MAL NEO-DIGEST	51	22.1	.	.	1.8	.	36.1	56.4	87.1	177.6	359.7	187.6	34.5	1.3
220	..MAL NEO-OTHER	33	14.3	3.4	1.8	1.8	5.9	.	.	67.7	162.8	179.9	469.0	20.0	1.4
200	..MAL NEO-GENITL	19	8.2	.	.	1.8	3.0	13.5	18.8	58.1	29.6	36.0	187.6	12.2	0.9
190	..MAL NEO-BREAST	13	5.6	.	.	.	.	9.0	37.6	29.0	29.6	.	.	9.3	0.4
180	..MAL NEO-RESPIR	5	2.2	.	.	.	.	.	6.3	9.7	14.8	36.0	93.8	3.2	0.2
240	..OTH NEOP LYMPH	4	1.7	.	.	.	.	.	.	9.7	.	71.9	93.8	2.4	0.4
210	..MAL NEO-URINAR	3	1.3	.	.	.	.	4.5	.	.	14.8	36.0	.	2.0	0.7
230	..LEUKEMIA	3	1.3	.	1.8	.	.	.	6.3	.	.	.	93.8	1.3	0.3
160	..MAL NEOPLS-LIP	1	0.4	.	.	.	.	.	.	.	.	36.0	.	0.7	0.4
310	DISEASE OF HEART	108	46.8	27.6	1.8	1.8	3.0	9.0	50.2	145.2	310.8	1043.2	2063.8	62.7	0.5
410	..ALL OTH HRT DS	57	24.7	27.6	.	1.8	.	4.5	18.8	77.4	133.2	503.6	1219.5	31.1	1.0
350	..ISCHMC HRT DIS	37	16.0	.	.	.	.	.	18.8	38.7	148.0	431.7	750.5	22.7	0.2
360	....ACUT MYO INF	21	9.1	.	.	.	.	.	18.8	.	103.6	287.8	281.4	13.4	0.3
390	....OLD MI,OTHER	13	5.6	.	.	.	.	.	.	29.0	44.4	107.9	375.2	7.7	0.2
370	....OTH ACUT IHD	3	1.3	.	.	.	.	.	.	9.7	.	36.0	93.8	1.7	2.2
320	..RHEUM FEVER	8	3.5	.	1.8	.	3.0	.	6.3	29.0	14.8	36.0	.	5.2	1.9
400	..OTH ENDOCRD DS	5	2.2	.	.	.	.	4.5	6.3	.	.	71.9	93.8	3.0	1.9
330	..HYPRTNS HRT DS	1	0.4	.	.	.	.	.	.	.	14.8	.	.	0.7	0.1
510	PNEUMONIA/INFLNZ	50	21.7	17.2	.	1.8	.	.	18.8	19.4	59.2	503.6	1970.0	23.9	2.6
520	..PNEUMONIA	46	19.9	17.2	.	1.8	.	.	18.8	19.4	44.4	467.6	1782.4	21.9	2.5
530	..INFLUENZA	4	1.7	.	.	.	.	.	.	.	14.8	36.0	187.6	2.0	3.3
620	LIVER DIS/CIRRHS	32	13.9	.	.	.	25.6	27.1	50.2	38.7	59.2	36.0	.	20.5	2.8
430	CEREBROVASC DS	31	13.4	.	.	.	.	4.5	25.1	19.4	74.0	215.8	1219.5	16.6	0.5
470	..ALL OTH CBV DS	26	11.3	.	.	.	.	4.5	6.3	9.7	74.0	215.8	1125.7	13.4	0.6
440	..INTRCRB HMRHG	5	2.2	.	.	.	.	.	18.8	9.7	.	.	93.8	3.2	0.6
730	CONGEN ANOMALIES	28	12.1	89.6	1.8	.	3.0	.	.	.	.	.	.	7.9	1.4
640	NEPHRITIS, ET AL	24	10.4	3.4	.	7.3	.	4.5	18.8	48.4	29.6	107.9	469.0	13.2	3.7
670	..RENAL FAIL,ETC	22	9.5	3.4	.	3.7	.	4.5	18.8	48.4	29.6	107.9	469.0	12.5	4.0
660	..CHRN GLMR/NEPH	2	0.9	.	.	3.7	.	.	.	.	.	.	.	0.7	1.3
260	DIABETES MELLITU	23	10.0	.	.	.	3.0	.	18.8	58.1	59.2	251.8	187.6	15.3	1.6
740	PERINATAL CONDIT	13	5.6	44.8	.	.	.	.	.	.	.	.	.	3.5	0.4
760	..OTH COND PERIN	10	4.3	34.4	.	.	.	.	.	.	.	.	.	2.7	0.5
750	..BIRTH TRAUMA	3	1.3	10.3	.	.	.	.	.	.	.	.	.	0.8	0.4
830	HOMICIDE	12	5.2	.	1.8	9.2	5.9	9.0	6.3	.	14.8	.	.	5.7	1.3

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Navajo Females (cont'd)

CODE[1]	CAUSE[2]	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
090	SEPTICEMIA	10	4.3	3.4	.	.	.	.	.	19.4	44.4	71.9	187.6	5.9	2.5
270	NUTRITION DEFICS	8	3.5	.	.	.	.	.	.	9.7	.	36.0	362.9	3.3	8.2
630	CHOLEL/GALLBLDR	7	3.0	.	.	.	.	.	6.3	.	14.8	107.9	187.6	4.0	5.7
030	TUBERCULOSIS	6	2.6	.	.	.	.	4.5	6.3	9.7	.	71.9	93.8	3.7	9.3
040	..TB-RESPIRATORY	4	1.7	.	.	.	.	.	.	9.7	.	71.9	93.8	2.4	7.9
050	..OTHER TB	2	0.9	.	.	.	.	4.5	6.3	.	.	.	.	1.4	13.5
140	ALL OTH INF/PARA	5	2.2	.	1.8	.	3.0	.	.	.	.	107.9	.	2.7	2.1
290	MENINGITIS	5	2.2	10.3	.	.	.	.	.	.	.	71.9	.	2.1	5.3
250	BENIGN NEO,OTHER	4	1.7	.	.	.	.	.	12.5	.	14.8	36.0	.	2.8	1.7
540	CHRON PULMON DIS	4	1.7	.	.	.	.	.	6.3	.	14.8	36.0	93.8	2.4	0.3
820	SUICIDE	4	1.7	.	.	5.5	.	.	6.3	.	.	.	.	1.7	0.3
580	..OTH CHRN PULMO	3	1.3	.	.	.	.	.	6.3	.	14.8	.	93.8	1.8	0.3
570	..ASTHMA	1	0.4	.	.	.	.	.	.	.	.	36.0	.	0.7	0.6
490	OTHER ARTERY DIS	3	1.3	.	.	.	.	.	6.3	.	.	36.0	93.8	1.7	0.6
280	ANEMIAS	2	0.9	.	.	.	.	.	.	.	.	.	187.6	0.6	0.8
700	PREGNANCY COMPLI	2	0.9	.	.	1.8	.	4.5	.	.	.	.	.	1.0	3.2
720	..OTH PREG COMPL	2	0.9	.	.	1.8	.	4.5	.	.	.	.	.	1.0	4.8
420	..HYPRTNS+/- RNL	1	0.4	.	.	.	.	.	.	.	14.8	.	.	0.7	0.4
480	ATHEROSCLEROSIS	1	0.4	.	.	.	.	.	.	.	.	.	93.8	0.3	0.1
590	ULCER-STOM,DUOD	1	0.4	.	.	.	.	.	.	.	.	36.0	.	0.7	0.5
610	HERNIA/INTST.OBS	1	0.4	.	.	.	.	.	.	.	.	36.0	.	0.7	0.5
770	SYMP/SIGN/ILL-DF	123	53.3	44.8	3.7	9.2	11.8	27.1	62.7	154.8	310.8	827.3	2157.6	68.3	9.6
840	ALL OTH EXTRNL C	6	2.6	.	1.8	.	.	9.0	.	19.4	.	36.0	.	3.7	4.2
780	ALL OTHER DISEAS	105	45.5	65.4	.	9.2	23.6	40.6	81.5	77.4	192.4	395.7	1782.4	54.4	1.9

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

NAVAJO MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
			ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	1514	697.6	502.9	60.7	494.0	670.3	727.7	973.1	1476.2	2725.9	5628.8	15238.1	845.1	1.1
790	ACCIDENTS/ADVERS	496	228.5	75.3	31.3	307.8	349.4	335.1	372.5	326.8	446.1	463.1	634.9	271.1	4.5
800	..MOTOR VEHICLE	298	137.3	37.6	12.9	223.5	222.4	199.0	205.3	124.0	214.8	178.1	105.8	156.8	4.8
810	..ALL OTH ACCDNT	198	91.2	37.6	18.4	84.3	127.1	136.1	167.2	202.8	231.3	285.0	529.1	114.3	4.2
310	DISEASE OF HEART	155	71.4	37.6	1.8	5.9	12.7	26.2	91.2	191.6	578.2	1282.5	3280.4	93.3	0.3
410	..ALL OTH HRT DS	78	35.9	37.6	1.8	2.0	6.4	20.9	38.0	33.8	165.2	676.9	2328.0	39.6	0.7
350	..ISCHMC HRT DIS	65	29.9	.	.	.	.	5.2	53.2	146.5	396.5	463.1	740.7	47.5	0.2
360	....ACUT MYO INF	37	17.0	.	.	.	.	5.2	30.4	90.2	214.8	249.4	423.3	27.2	0.2
390	....OLD MI,OTHER	28	12.9	.	.	.	.	.	22.8	56.3	181.7	213.8	317.5	20.3	0.2
320	..RHEUM FEVER	4	1.8	.	.	3.9	3.2	.	.	11.3	.	.	.	2.1	1.2
330	..HYPRTNS HRT DS	4	1.8	.	.	.	.	.	.	.	.	142.5	.	2.3	0.4
400	..OTH ENDOCRD DS	3	1.4	.	.	.	3.2	.	.	.	16.5	.	105.8	1.6	0.6
340	..HYPRTNS+RENAL	1	0.5	.	.	.	.	.	.	.	.	.	105.8	0.3	0.3
150	MALIG NEOPLASMS	99	45.6	.	1.8	9.8	6.4	26.2	91.2	135.2	429.5	783.8	1481.5	65.8	0.4
170	..MAL NEO-DIGEST	46	21.2	.	.	.	.	5.2	38.0	90.2	181.7	498.8	740.7	31.3	0.8
220	..MAL NEO-OTHER	14	6.5	.	.	2.0	3.2	.	7.6	.	99.1	106.9	211.6	8.8	0.4
200	..MAL NEO-GENITL	12	5.5	.	.	3.9	.	.	7.6	.	66.1	35.6	423.3	6.4	0.4
180	..MAL NEO-RESPIR	11	5.1	.	.	.	.	5.2	30.4	11.3	33.0	106.9	.	8.6	0.1
240	..OTH NEOP LYMPH	6	2.8	.	.	2.0	3.2	5.2	.	.	33.0	.	105.8	3.4	0.4
230	..LEUKEMIA	5	2.3	.	1.8	2.0	.	10.5	.	.	16.5	.	.	2.9	0.4
210	..MAL NEO-URINAR	4	1.8	.	.	.	.	.	7.6	33.8	.	.	.	3.7	0.5
160	..MAL NEOPLS-LIP	1	0.5	.	.	.	.	.	.	.	.	35.6	.	0.6	0.1
510	PNEUMONIA/INFLNZ	70	32.3	23.9	3.7	2.0	15.9	.	22.8	67.6	148.7	427.5	2645.5	34.2	2.1
520	..PNEUMONIA	68	31.3	20.5	3.7	2.0	15.9	.	22.8	67.6	148.7	427.5	2539.7	33.7	2.1
530	..INFLUENZA	2	0.9	3.4	.	.	.	.	.	.	.	.	105.8	0.5	0.9
820	SUICIDE	49	22.6	.	1.8	43.1	57.2	20.9	30.4	.	.	.	.	23.7	1.3
830	HOMICIDE	47	21.7	.	.	39.2	25.4	52.4	30.4	33.8	16.5	.	.	25.6	1.5
430	CEREBROVASC DS	31	14.3	3.4	.	.	.	.	.	56.3	49.6	498.8	846.6	17.5	0.4
620	LIVER DIS/CIRRHS	31	14.3	.	.	.	22.2	62.8	30.4	45.1	16.5	106.9	.	22.2	1.4
470	..ALL OTH CBV DS	22	10.1	.	.	.	.	.	.	22.5	33.0	427.5	634.9	11.9	0.4
440	..INTRCRB HMRHG	7	3.2	.	.	.	.	.	.	33.8	16.5	71.3	105.8	5.0	0.8
450	..CEREBRL THROMB	2	0.9	3.4	.	.	.	.	.	.	.	.	105.8	0.5	0.1
730	CONGEN ANOMALIES	30	13.8	85.5	.	3.9	6.4	.	.	.	.	.	105.8	8.9	1.5
740	PERINATAL CONDIT	27	12.4	85.5	.	.	.	.	.	.	.	.	.	6.9	0.7
760	..OTH COND PERIN	15	6.9	44.5	.	.	.	.	.	.	.	.	.	3.6	0.5
750	..BIRTH TRAUMA	12	5.5	41.1	.	.	.	.	.	.	.	.	.	3.3	1.0
640	NEPHRITIS, ET AL	20	9.2	.	.	2.0	9.5	20.9	7.6	33.8	49.6	106.9	211.6	13.1	2.3
670	..RENAL FAIL,ETC	17	7.8	.	.	2.0	6.4	20.9	.	33.8	33.0	106.9	211.6	10.9	2.2
660	..CHRN GLMR/NEPH	3	1.4	.	.	.	3.2	.	7.6	.	16.5	.	.	2.2	3.7

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Navajo Males (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE[1]	CAUSE[2]	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
260	DIABETES MELLITU	18	8.3	.	.	.	3.2	5.2	22.8	45.1	99.1	.	317.5	13.2	1.3
140	ALL OTH INF/PARA	11	5.1	6.8	1.8	.	3.2	5.2	15.2	.	.	35.6	317.5	5.3	3.1
540	CHRON PULMON DIS	11	5.1	3.4	.	.	.	.	7.6	45.1	16.5	35.6	317.5	7.0	0.3
580	..OTH CHRN PULMO	6	2.8	.	.	.	.	.	.	33.8	.	35.6	211.6	3.9	0.2
550	..BRONCH,CHRON	2	0.9	3.4	.	.	.	.	7.6	.	.	.	.	1.2	0.8
570	..ASTHMA	2	0.9	.	.	.	.	.	.	11.3	.	.	105.8	1.2	1.2
560	..EMPHYSEMA	1	0.5	.	.	.	.	.	.	.	16.5	.	.	0.8	0.1
030	TUBERCULOSIS	8	3.7	.	.	.	.	.	7.6	11.3	.	106.9	317.5	4.3	4.3
090	SEPTICEMIA	8	3.7	13.7	.	.	3.2	.	.	22.5	16.5	.	.	4.3	1.3
420	..HYPRTNS+/- RNL	8	3.7	.	.	.	.	5.2	7.6	56.3	.	35.6	.	6.8	3.1
630	CHOLEL/GALLBLDR	8	3.7	.	.	.	.	.	.	33.8	.	106.9	211.6	5.0	6.3
040	..TB-RESPIRATORY	7	3.2	.	.	.	.	.	7.6	11.3	.	71.3	317.5	3.8	4.7
050	..OTHER TB	1	0.5	.	.	.	.	.	.	.	.	35.6	.	0.6	5.8
210	MENINGITIS	7	3.2	20.5	.	.	.	.	.	.	.	35.6	.	2.2	3.2
270	NUTRITION DEFICS	4	1.8	.	.	.	.	.	.	.	16.5	106.9	.	2.5	5.1
080	MENINGOCOCCL INF	3	1.4	10.3	.	.	.	.	.	.	.	.	.	0.8	4.2
480	ATHEROSCLEROSIS	3	1.4	.	.	.	.	.	.	.	16.5	.	211.6	1.3	0.2
490	OTHER ARTERY DIS	3	1.4	.	.	.	.	.	7.6	11.3	16.5	.	.	2.6	0.3
120	VIRAL HEPATITIS	1	0.5	3.4	.	.	.	.	.	.	.	.	.	0.3	0.7
250	BENIGN NEO,OTHER	1	0.5	.	.	.	.	5.2	.	.	.	.	.	0.7	0.3
500	ACUTE BRONCHITIS	1	0.5	3.4	.	.	.	.	.	.	.	.	.	0.3	1.4
610	HERNIA/INTST.OBS	1	0.5	.	.	.	.	.	.	.	.	35.6	.	0.6	0.4
770	SYMP/SIGN/ILL-DF	165	76.0	51.3	12.9	45.1	50.8	36.6	106.4	169.0	462.6	819.4	1693.1	94.0	7.2
840	ALL OTH EXTRNL C	19	8.8	3.4	.	7.8	19.1	10.5	15.2	11.3	49.6	.	.	11.3	5.1
780	ALL OTHER DISEAS	179	82.5	75.3	5.5	27.4	85.8	115.2	106.4	180.3	297.4	641.3	2545.5	100.3	2.4

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

OKLAHOMA CITY BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	2873	542.3	307.9	21.2	153.2	214.8	275.6	613.3	1313.4	2526.7	4274.2	9849.0	530.6	0.9
310	DISEASE OF HEART	829	156.5	1.9	.	7.9	10.0	42.9	130.9	388.5	986.3	1827.0	4049.4	146.4	0.8
350	..ISCHMC HRT DIS	619	116.8	1.9	.	1.8	7.5	25.1	105.7	303.7	750.6	1391.2	2779.7	110.1	0.8
360	....ACUT MYO INF	381	71.9	.	.	1.8	3.8	17.9	71.2	191.5	518.7	838.1	1132.5	69.9	0.9
390	....OLD MI,OTHER	204	38.5	1.9	.	.	3.8	7.2	27.6	82.1	184.7	528.0	1510.0	33.9	0.6
370	....OTH ACUT IHD	31	5.9	.	.	.	.	.	6.9	30.1	47.2	16.8	68.6	6.0	4.6
380	....ANGINA PECTO	3	0.6	.	.	.	.	.	.	.	.	8.4	68.6	0.3	3.4
410	..ALL OTH HRT DS	180	34.0	.	.	5.3	2.5	14.3	23.0	68.4	200.4	360.4	1201.1	30.8	0.8
330	..HYPRTNS HRT DS	18	3.4	.	.	.	.	3.6	2.3	5.5	19.6	58.7	34.3	3.3	0.6
400	..OTH ENDOCRD DS	6	1.1	.	.	0.9	.	.	.	8.2	7.9	.	.	1.2	0.6
340	..HYPRTNS+RENAL	4	0.8	.	.	.	.	.	.	.	3.9	16.8	34.3	0.6	0.7
320	..RHEUM FEVER	2	0.4	.	.	.	.	.	.	2.7	3.9	.	.	0.4	0.2
130	MALIG NEOPLASMS	450	84.9	3.8	1.8	4.4	8.8	28.6	105.7	281.8	546.2	829.7	1063.8	85.7	0.7
170	..MAL NEO-DIGEST	125	23.6	.	.	.	1.3	8.9	32.2	62.9	153.3	268.2	377.5	23.4	0.7
180	..MAL NEO-RESPIR	110	20.8	1.9	.	0.9	1.3	1.8	20.7	104.0	141.5	142.5	205.9	21.4	0.6
200	..MAL NEO-GENITL	56	10.6	.	.	.	1.3	3.6	11.5	27.4	66.8	134.1	171.6	10.3	0.8
220	..MAL NEO-OTHER	56	10.6	.	.	2.6	2.5	10.7	6.9	10.9	58.9	150.9	171.6	10.0	0.6
210	..MAL NEO-URINAR	27	5.1	1.9	.	.	2.5	.	6.9	24.6	27.5	25.1	68.6	5.3	1.0
240	..OTH NEOP LYMPH	26	4.9	.	.	.	.	.	6.9	16.4	47.2	33.5	34.3	5.1	0.7
190	..MAL NEO-BREAST	25	4.7	.	.	.	.	1.8	16.1	19.2	27.5	16.8	34.3	5.4	0.4
230	..LEUKEMIA	14	2.6	.	1.8	0.9	.	1.8	2.3	8.2	7.9	33.5	.	2.6	0.5
160	..MAL NEOPLS-LIP	11	2.1	.	.	.	.	.	2.3	8.2	15.7	25.1	.	2.1	0.8
790	ACCIDENTS/ADVERS	344	64.9	21.2	9.2	95.1	101.7	53.7	78.1	93.0	90.4	41.9	240.2	66.9	1.7
800	..MOTOR VEHICLE	239	45.1	13.5	5.5	80.1	74.1	42.9	36.8	54.7	39.3	25.1	68.6	45.8	2.1
810	..ALL OTH ACCDNT	105	19.8	7.7	3.7	15.0	27.6	10.7	41.3	38.3	51.1	16.8	171.6	21.1	1.2
430	CEREBROVASC DS	182	34.4	1.9	.	0.9	1.3	7.2	23.0	71.1	153.3	469.3	1510.0	29.7	0.8
470	..ALL OTH CBV DS	135	25.5	.	.	.	.	3.6	11.5	43.8	121.8	402.3	1132.5	21.4	0.8
440	..INTRCRB HMRHG	30	5.7	.	.	0.9	.	3.6	11.5	21.9	11.8	41.9	205.9	5.6	0.9
450	..CEREBRL THROMB	16	3.0	1.9	.	.	.	.	.	5.5	19.6	25.1	171.6	2.5	0.4
460	..CEREBRL EMBOL	1	0.2	.	.	.	1.3	.	.	.	.	.	.	0.2	1.0
260	DIABETES MELLITU	132	24.9	.	.	.	.	10.7	32.2	134.1	169.0	134.1	137.3	26.[illegible]	2.7
620	LIVER DIS/CIRRHS	115	21.7	.	.	3.5	26.4	34.0	52.8	57.5	86.5	41.9	.	25.4	2.2
510	PNEUMONIA/INFLNZ	87	16.4	9.6	1.8	0.9	1.3	7.2	6.9	16.4	66.8	217.9	755.0	13.7	1.1
520	..PNEUMONIA	87	16.4	9.6	1.8	0.9	1.3	7.2	6.9	16.4	66.8	217.9	755.0	13.7	1.2
830	HOMICIDE	61	11.5	3.8	0.9	10.6	23.9	17.9	23.0	13.7	.	.	.	12.5	1.2
740	PERINATAL CONDIT	60	11.3	115.4	.	.	.	.	.	.	.	.	.	9.2	1.0
760	..OTH COND PERIN	33	6.2	63.5	.	.	.	.	.	.	.	.	.	5.1	0.8
750	..BIRTH TRAUMA	27	5.1	52.0	.	.	.	.	.	.	.	.	.	4.2	1.5
640	NEPHRITIS, ET AL	45	8.5	.	.	0.9	1.3	.	13.8	27.4	27.5	41.9	514.8	7.7	1.7

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Oklahoma Both Sexes (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE[1]	CAUSE[2]	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
670	..RENAL FAIL,ETC	39	7.4	.	.	0.9	.	.	11.5	24.6	15.7	41.9	514.8	6.4	1.7
660	..CHRN GLMR/NEPH	6	1.1	.	.	.	1.3	.	2.3	2.7	11.8	.	.	1.3	2.5
540	CHRON PULMON DIS	39	7.4	.	.	.	.	.	11.5	21.9	47.2	92.2	103.0	7.3	0.4
580	..OTH CHRN PULMO	30	5.7	.	.	.	.	.	6.9	13.7	39.3	75.4	103.0	5.4	0.5
550	..BRONCH,CHRON	3	0.6	.	.	.	.	.	2.3	2.7	3.9	.	.	0.7	0.7
560	..EMPHYSEMA	3	0.6	.	.	.	.	.	.	2.7	3.9	8.4	.	0.6	0.1
570	..ASTHMA	3	0.6	.	.	.	.	.	2.3	2.7	.	8.4	.	0.6	0.6
820	.SUICIDE	35	6.6	.	.	9.7	13.8	7.2	4.6	2.7	19.6	8.4	.	6.9	0.6
730	CONGEN ANOMALIES	29	5.5	42.3	0.9	1.8	.	1.8	2.3	5.5	.	.	.	4.8	0.8
090	SEPTICEMIA	25	4.7	3.8	.	.	.	.	4.6	13.7	23.6	58.7	103.0	4.4	1.5
480	ATHEROSCLEROSIS	23	4.3	.	.	.	.	.	.	5.5	19.6	50.3	343.2	3.2	0.6
490	OTHER ARTERY DIS	14	2.6	.	.	0.9	.	.	2.3	10.9	11.8	33.5	34.3	2.6	0.5
290	MENINGITIS	13	2.5	11.5	.	0.9	.	3.6	2.3	2.7	7.9	.	.	2.5	4.9
030	TUBERCULOSIS	12	2.3	1.9	.	0.9	1.3	1.8	.	5.5	11.8	16.8	34.3	2.2	3.6
040	..TB-RESPIRATORY	10	1.9	.	.	0.9	1.3	1.8	.	2.7	11.8	16.8	34.3	1.8	3.6
050	..OTHER TB	2	0.4	1.9	.	.	.	.	.	2.7	.	.	.	0.4	3.7
590	ULCER-STOM,DUOD	10	1.9	.	.	.	.	3.6	6.9	8.2	3.9	8.4	.	2.3	1.8
630	CHOLEL/GALLBLDR	8	1.5	.	.	.	.	.	.	.	15.7	33.5	.	1.3	1.9
420	..HYPRTNS+/- RNL	7	1.3	.	.	.	.	.	.	2.7	11.8	8.4	68.6	1.1	0.6
140	ALL OTH INF/PARA	6	1.1	1.9	0.9	.	.	.	.	2.7	3.9	16.8	.	1.0	0.7
250	BENIGN NEO,OTHER	6	1.1	.	.	0.9	.	1.8	.	2.7	11.8	.	.	1.2	0.6
680	KIDNEY INFECTION	6	1.1	.	.	.	.	.	4.6	.	3.9	8.4	68.6	1.1	2.1
610	HERNIA/INTST.OBS	4	0.8	.	.	.	.	.	.	.	7.9	.	68.6	0.6	0.4
120	VIRAL HEPATITIS	3	0.6	.	.	.	.	1.8	4.6	.	.	.	.	0.8	2.6
280	ANEMIAS	3	0.6	.	.	0.9	.	.	.	.	.	16.8	.	0.4	0.5
500	ACUTE BRONCHITIS	2	0.4	1.9	.	.	.	.	.	.	3.9	.	.	0.3	1.7
600	APPENDICITIS	2	0.4	.	.	.	.	.	.	5.5	.	.	.	0.4	2.2
690	PROSTATE HYPERPL	2	0.4	.	.	.	.	.	.	2.7	.	8.4	.	0.4	3.6
010	SHIGELL/AMEBIASI	1	0.2	1.9	.	.	.	.	.	.	.	.	.	0.2	.
270	NUTRITION DEFICS	1	0.2	.	.	.	.	.	.	.	.	.	34.3	0.1	0.2
700	PREGNANCY COMPLI	1	0.2	.	.	.	.	1.8	.	.	.	.	.	0.2	2.5
720	..OTH PREG COMPL	1	0.2	.	.	.	.	1.8	.	.	.	.	.	0.2	2.5
770	SYMP/SIGN/ILL-DF	63	11.9	65.4	0.9	4.4	6.3	5.4	6.9	8.2	15.7	16.8	103.0	10.8	1.1
840	ALL OTH EXTRNL C	6	1.1	.	.	0.9	3.8	1.8	2.3	.	.	.	.	1.3	0.9
780	ALL OTHER DISEAS	247	46.6	19.2	4.6	7.9	15.1	42.9	94.2	128.6	180.8	293.3	617.7	49.1	1.4

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

OKLAHOMA CITY FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	1209	451.3	301.7	9.5	100.9	123.3	163.0	408.7	956.5	1855.7	3506.1	8979.6	393.3	0.9
310	DISEASE OF HEART	335	125.1	4.0	.	10.8	9.9	7.1	44.4	210.9	627.8	1482.8	3724.5	96.5	0.7
350	..ISCHMC HRT DIS	235	87.7	4.0	.	.	7.4	3.5	22.2	138.9	489.8	1067.1	2551.0	67.2	0.7
360	....ACUT MYO INF	126	47.0	.	.	.	2.5	3.5	22.2	61.7	351.8	540.5	867.3	38.2	0.8
390	....OLD MI,OTHER	99	37.0	4.0	.	.	4.9	.	.	61.7	124.2	485.0	1581.6	26.1	0.6
370	....OTH ACUT IHD	8	3.0	.	.	.	.	.	.	15.4	13.8	27.7	51.0	2.6	3.2
380	....ANGINA PECTO	2	0.7	.	.	.	.	.	.	.	.	13.9	51.0	0.4	4.2
410	..ALL OTH HRT DS	83	31.0	.	.	9.0	2.5	3.5	17.8	51.4	131.1	304.9	1071.4	24.1	0.8
330	..HYPRTNS HRT DS	9	3.4	.	.	.	.	.	4.4	5.1	.	83.1	51.0	2.6	0.5
400	..OTH ENDOCRD DS	5	1.9	.	.	1.8	.	.	.	15.4	6.9	.	.	1.9	1.2
340	..HYPRTNS+RENAL	3	1.1	.	.	.	.	.	.	.	.	27.7	51.0	0.7	1.0
150	MALIG NEOPLASMS	211	78.8	4.0	1.9	3.6	4.9	21.3	106.6	257.1	427.7	623.6	918.4	72.8	0.7
170	..MAL NEO-DIGEST	59	22.0	.	.	.	.	.	26.7	56.6	144.9	221.7	255.1	19.5	0.8
200	..MAL NEO-GENITL	34	12.7	.	.	.	2.5	7.1	17.8	36.0	69.0	97.0	153.1	11.9	0.9
180	..MAL NEO-RESPIR	30	11.2	.	.	.	.	3.5	.	72.0	35.2	55.4	153.1	10.4	0.6
220	..MAL NEO-OTHER	29	10.8	.	.	1.8	.	3.5	13.3	10.3	48.3	152.4	204.1	9.0	0.6
190	..MAL NEO-BREAST	25	9.3	.	.	.	.	3.5	31.1	36.0	48.3	27.7	51.0	9.9	0.4
240	..OTH NEOP LYMPH	13	4.9	.	.	.	.	.	8.9	15.4	41.4	13.9	51.0	4.7	0.8
210	..MAL NEO-URINAR	9	3.4	4.0	.	.	2.5	.	4.4	20.6	.	13.9	51.0	3.3	1.1
230	..LEUKEMIA	7	2.6	.	1.9	1.8	.	3.5	4.4	5.1	6.9	13.9	.	2.6	0.7
160	..MAL NEOPLS-LIP	5	1.9	.	.	.	.	.	.	5.1	13.8	27.7	.	1.6	1.1
430	CEREBROVASC DS	109	40.7	.	.	.	2.5	7.1	22.2	51.4	158.7	471.2	1734.7	30.0	0.8
470	..ALL OTH CSV DS	82	30.6	.	.	.	.	3.5	8.9	25.7	144.9	388.0	1275.5	21.9	0.9
440	..INTRCRB HMRHG	16	6.0	.	.	.	.	3.5	13.3	20.6	6.9	41.6	204.1	5.4	1.0
450	..CEREBRL THROMB	10	3.7	.	.	.	.	.	.	5.1	6.9	41.6	255.1	2.3	0.4
460	..CEREBRL EMBOL	1	0.4	.	.	.	2.5	.	.	.	.	.	.	0.4	2.0
790	ACCIDENTS/ADVERS	93	34.7	23.8	5.7	55.9	49.3	17.7	35.5	41.1	48.3	41.6	102.0	34.5	1.7
800	..MOTOR VEHICLE	75	28.0	15.9	5.7	52.3	44.4	17.7	22.2	25.7	13.8	41.6	51.0	17.8	2.5
810	..ALL OTH ACCDNT	18	6.7	7.9	.	3.6	4.9	.	13.3	15.4	34.5	.	51.0	6.7	0.7
260	DIABETES MELLITU	73	27.3	.	.	.	.	10.6	35.5	133.7	165.6	124.7	153.1	27.0	2.8
620	LIVER DIS/CIRRHS	46	17.2	.	.	1.8	17.3	24.8	44.4	41.1	69.0	41.6	.	19.1	2.6
510	PNEUMONIA/INFLNZ	36	13.4	7.9	.	1.8	.	7.1	.	15.4	41.4	166.3	510.2	9.9	1.1
520	..PNEUMONIA	36	13.4	7.9	.	1.8	.	7.1	.	15.4	41.4	166.3	510.2	9.9	1.1
740	PERINATAL CONDIT	28	10.5	111.2	.	.	.	.	.	.	.	.	.	8.8	1.1
760	..OTH COND PERIN	19	7.1	75.4	.	.	.	.	.	.	.	.	.	6.0	1.0
750	..BIRTH TRAUMA	9	3.4	35.7	.	.	.	.	.	.	.	.	.	2.8	1.2
640	NEPHRITIS, ET AL	26	9.7	.	.	.	2.5	.	8.9	41.1	27.6	41.6	408.2	8.1	2.3
670	..RENAL FAIL,ETC	21	7.8	.	.	.	.	.	8.9	36.0	6.9	41.6	408.2	6.3	2.0
660	..CHRN GLMR/NEPH	5	1.9	.	.	.	2.5	.	.	5.1	20.7	.	.	1.8	3.6

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Oklahoma Females (cont'd)

CODE[1]	CAUSE[2]	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
730	CONGEN ANOMALIES	18	6.7	55.6	.	1.8	.	.	4.4	10.3	.	.	.	6.0	1.1
830	HOMICIDE	17	6.3	.	.	5.4	14.8	14.2	13.3	5.1	.	.	.	7.4	1.7
480	ATHEROSCLEROSIS	14	5.2	.	.	.	.	.	.	5.1	27.6	41.6	306.1	3.5	0.8
540	CHRON PULMON DIS	11	4.1	.	.	.	.	.	.	20.6	27.6	41.6	.	3.7	0.4
580	..OTH CHRN PULMO	7	2.6	.	.	.	.	.	.	15.4	13.8	27.7	.	2.4	0.4
570	..ASTHMA	2	0.7	.	.	.	.	.	.	5.1	.	13.9	.	0.7	0.6
550	..BRONCH,CHRON	1	0.4	.	.	.	.	.	.	.	6.9	.	.	0.3	0.6
560	..EMPHYSEMA	1	0.4	.	.	.	.	.	.	.	6.9	.	.	0.3	0.2
090	SEPTICEMIA	9	3.4	4.0	.	.	.	.	4.4	5.1	6.9	55.4	51.0	2.7	1.1
490	OTHER ARTERY DIS	8	3.0	.	.	1.8	.	.	4.4	10.3	13.8	13.9	51.0	2.7	0.9
290	MENINGITIS	6	2.2	11.9	.	.	.	3.5	4.4	.	6.9	.	.	2.3	5.7
630	CHOLEL/GALLBLDR	5	1.9	.	.	.	.	.	.	.	20.7	27.7	.	1.5	2.2
680	KIDNEY INFECTION	5	1.9	.	.	.	.	.	4.4	.	6.9	13.9	102.0	1.4	2.4
820	SUICIDE	5	1.9	.	.	5.4	2.5	3.5	.	.	.	.	.	1.9	0.3
030	TUBERCULOSIS	4	1.5	.	.	.	.	.	.	5.1	6.9	27.7	.	1.2	3.1
250	BENIGN NEO,OTHER	4	1.5	.	.	1.8	.	3.5	.	5.1	6.9	.	.	1.6	0.9
420	..HYPRTNS+/- RNL	4	1.5	.	.	.	.	.	.	.	13.8	.	102.0	1.0	0.6
040	..TB-RESPIRATORY	3	1.1	.	.	.	.	.	.	.	6.9	27.7	.	0.8	2.8
050	..OTHER TB	1	0.4	.	.	.	.	.	.	5.1	.	.	.	0.4	4.0
590	ULCER-STOM,DUOD	3	1.1	.	.	.	.	.	4.4	5.1	6.9	.	.	1.3	1.0
120	VIRAL HEPATITIS	2	0.7	.	.	.	.	3.5	4.4	.	.	.	.	1.0	3.4
140	ALL OTH INF/PARA	1	0.4	.	.	.	.	.	.	.	.	13.9	.	0.3	0.2
280	ANEMIAS	1	0.4	.	.	.	.	.	.	.	.	13.9	.	0.3	0.3
500	ACUTE BRONCHITIS	1	0.4	4.0	.	.	.	.	.	.	.	.	.	0.3	3.1
610	HERNIA/INTST.OBS	1	0.4	.	.	.	.	.	.	.	.	.	51.0	0.2	0.1
700	PREGNANCY COMPLI	1	0.4	.	.	.	.	3.5	.	.	.	.	.	0.5	1.7
720	..OTH PREG COMPL	1	0.4	.	.	.	.	3.5	.	.	.	.	.	0.5	2.5
770	SYMP/SIGN/ILL-DF	23	8.6	51.6	.	3.6	7.4	3.5	.	.	6.9	13.9	102.0	7.4	1.0
840	ALL OTH EXTRNL C	1	0.4	.	.	.	.	.	4.4	.	.	.	.	0.5	0.6
780	ALL OTHER DISEAS	108	40.3	23.8	1.9	7.2	12.3	31.9	62.2	92.6	138.0	249.4	663.3	37.9	1.3

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

OKLAHOMA CITY MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
			ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	1664	635.3	313.6	32.4	203.2	309.8	390.5	832.2	1719.0	3416.0	5456.5	11635.2	693.0	0.9
310	DISEASE OF HEART	494	188.6	.	.	5.2	10.2	79.5	223.5	590.5	1461.7	2356.7	4717.0	208.8	0.8
350	..ISCHMC HRT DIS	384	146.8	.	.	3.4	7.7	47.0	195.0	491.1	1096.3	1889.6	3249.5	163.3	0.8
360	....ACUT MYO INF	255	97.4	.	.	3.4	5.1	32.5	123.6	339.1	740.0	1295.1	1677.1	109.3	0.9
390	....OLD MI,OTHER	105	40.1	.	.	.	2.6	14.5	57.1	105.2	264.9	594.5	1362.7	43.6	0.5
370	....OTH ACUT IHD	23	8.8	.	.	.	.	.	14.3	46.8	91.4	.	104.8	10.2	4.8
380	....ANGINA PECTO	1	0.4	.	.	.	.	.	.	.	.	.	104.8	0.3	1.3
410	..ALL OTH HRT DS	97	37.0	.	.	1.7	2.6	25.3	28.5	87.7	292.3	445.9	1467.5	39.7	0.7
330	..HYPRTNS HRT DS	9	3.4	.	.	.	.	7.2	.	5.8	45.7	21.2	.	4.0	0.6
320	..RHEUM FEVER	2	0.8	.	.	.	.	.	.	5.8	9.1	.	.	0.9	0.5
340	..HYPRTNS+RENAL	1	0.4	.	.	.	.	.	.	.	9.1	.	.	0.4	0.5
400	..OTH ENDOCRD DS	1	0.4	.	.	.	.	.	.	.	9.1	.	.	0.4	0.2
790	ACCIDENTS/ADVERS	251	95.8	18.7	12.6	132.6	156.2	90.4	123.6	152.0	146.2	42.5	524.1	101.2	1.7
800	..MOTOR VEHICLE	164	62.6	11.2	5.4	106.7	105.0	68.7	52.3	87.7	73.1	.	104.8	64.5	2.0
810	..ALL OTH ACCDNT	87	33.2	7.5	7.2	25.8	51.2	21.7	71.3	64.3	73.1	42.5	419.3	36.7	1.3
150	MALIG NEOPLASMS	239	91.2	3.7	1.8	5.2	12 8	36.2	104.6	309.9	703.5	1146.5	1362.7	102.3	0.6
180	..MAL NEO-RESPIR	80	30.5	3.7	.	1.7	2.6	.	42.8	140.3	255.8	276.0	314.5	35.2	0.6
170	..MAL NEO-DIGEST	66	25.2	.	.	.	2.6	18.1	38.0	70.2	164.4	339.7	628.9	28.2	0.7
220	..MAL NEO-OTHER	27	10.3	.	.	3.4	5.1	18.1	.	11.7	73.1	148.6	104.8	11.1	0.5
200	..MAL NEO-GENITL	22	8.4	.	.	.	.	.	4.8	17.5	64.0	191.1	209.6	8.7	0.6
210	..MAL NEO-URINAR	18	6.9	.	.	.	2.6	.	9.5	29.2	64.0	42.5	104.8	8.0	1.0
240	..OTH NEOP LYMPH	13	5.0	.	.	.	.	.	4.8	17.5	54.8	63.7	.	5.7	0.7
230	..LEUKEMIA	7	2.7	.	1.8	.	.	.	.	11.7	9.1	63.7	.	2.7	0.4
160	..MAL NEOPLS-LIP	6	2.3	.	.	.	.	.	4.8	11.7	18.3	21.2	.	2.8	0.6
430	CEREBROVASC DS	73	27.9	3.7	.	1.7	.	7.2	23.8	93.6	146.2	467.1	1048.2	29.3	0.7
470	..ALL OTH CBV DS	53	20.2	.	.	.	.	3.6	14.3	64.3	91.4	424.6	838.6	20.8	0.8
440	..INTRCRB HMRG	14	5.3	.	.	1.7	.	3.6	9.5	23.4	18.3	42.5	209.6	5.9	0.9
450	..CEREBRL THROMB	6	2.3	3.7	.	.	.	.	.	5.8	36.5	.	.	2.5	0.3
620	LIVER DIS/CIRRHS	69	26.3	.	.	5.2	35.8	43.4	61.8	76.0	109.6	42.5	.	32.3	2.0
260	DIABETES MELLITU	59	22.5	.	.	.	.	10.8	28.5	134.5	173.6	148.6	104.8	27.0	2.7
510	PNEUMONIA/INFLNZ	51	19.5	11.2	3.6	.	2.6	7.2	14.3	17.5	100.5	297.2	1257.9	18.8	1.1
520	..PNEUMONIA	51	19.5	11.2	3.6	.	2.6	7.2	14.3	17.5	100.5	297.2	1257.9	18.8	1.2
830	HOMICIDE	44	16.8	7.5	1.8	15.5	33.3	21.7	33.3	23.4	.	.	.	17.9	1.1
740	PERINATAL CONDIT	32	12.2	119.5	.	.	.	.	.	.	.	.	.	9.7	0.9
750	..BIRTH TRAUMA	18	6.9	67.2	.	.	.	.	.	.	.	.	.	5.4	1.7
760	..OTH COND PERIN	14	5.3	52.3	.	.	.	.	.	.	.	.	.	4.2	0.6
820	SUICIDE	30	11.5	.	.	13.8	25.6	10.8	9.5	5.8	45.7	21.2	.	12.2	0.7
540	CHRON PULMON DIS	28	10.7	.	.	.	.	.	23.8	23.4	73.1	169.9	314.5	11.8	0.5
580	..OTH CHRN PULMO	23	8.8	.	.	.	.	.	14.3	11.7	73.1	148.6	314.5	9.4	0.5

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Oklahoma Males (cont'd)

CODE[1]	CAUSE[2]	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
550	..BRONCH,CHRON	2	0.8	.	.	.	.	.	4.8	5.8	.	.	.	1.1	0.7
560	..EMPHYSEMA	2	0.8	.	.	.	.	.	.	5.8	.	21.2	.	0.8	0.1
570	..ASTHMA	1	0.4	.	.	.	.	.	4.8	.	.	.	.	0.6	0.6
640	NEPHRITIS, ET AL	19	7.3	.	.	1.7	.	.	19.0	11.7	27.4	42.5	733.8	7.3	1.3
670	..RENAL FAIL,ETC	18	6.9	.	.	1.7	.	.	14.3	11.7	27.4	42.5	733.8	6.8	1.4
660	..CHRN GLMR/NEPH	1	0.4	.	.	.	.	.	4.8	.	.	.	.	0.6	1.0
090	SEPTICEMIA	16	6.1	3.7	.	.	.	.	4.8	23.4	45.7	63.7	209.6	6.5	1.9
730	CONGEN ANOMALIES	11	4.2	29.9	1.8	1.7	.	3.6	.	.	.	.	.	3.5	0.6
480	ATHEROSCLEROSIS	9	3.4	.	.	.	.	.	.	5.8	9.1	63.7	419.3	3.0	0.5
030	TUBERCULOSIS	8	3.1	3.7	.	1.7	2.6	3.6	.	5.8	18.3	.	104.8	3.1	3.1
040	..TB-RESPIRATORY	7	2.7	.	.	1.7	2.6	3.6	.	5.8	18.3	.	104.8	2.8	3.5
050	..OTHER TB	1	0.4	3.7	.	.	.	.	.	.	.	.	.	0.3	3.0
290	MENINGITIS	7	2.7	11.2	.	1.7	.	3.6	.	5.8	9.1	.	.	2.6	3.8
590	ULCER-STOM,DUOD	7	2.7	.	.	.	.	7.2	9.5	11.7	.	21.2	.	3.5	1.5
490	OTHER ARTERY DIS	6	2.3	.	.	.	.	.	.	11.7	9.1	63.7	.	2.4	0.3
140	ALL OTH INF/PARA	5	1.9	3.7	1.8	.	.	.	.	5.8	9.1	21.2	.	1.9	1.1
420	..HYPRTNS+/- RNL	3	1.1	.	.	.	.	.	.	5.8	9.1	21.2	.	1.3	0.6
610	HERNIA/INTST.OBS	3	1.1	.	.	.	.	.	.	.	18.3	.	104.8	1.1	0.9
630	CHOLEL/GALLBLDR	3	1.1	.	.	.	.	.	.	.	9.1	42.5	.	1.1	1.4
250	BENIGN NEO,OTHER	2	0.8	.	.	.	.	.	.	.	18.3	.	.	0.9	0.4
280	ANEMIAS	2	0.8	.	.	1.7	.	.	.	.	.	21.2	.	0.7	0.7
600	APPENDICITIS	2	0.8	.	.	.	.	.	.	11.7	.	.	.	1.0	3.2
690	PROSTATE HYPERPL	2	0.8	.	.	.	.	.	.	5.8	.	21.2	.	0.8	2.1
010	SHIGELL/AMEBIASI	1	0.4	3.7	.	.	.	.	.	.	.	.	.	0.3	.
120	VIRAL HEPATITIS	1	0.4	.	.	.	.	.	4.8	.	.	.	.	0.6	1.4
270	NUTRITION DEFICS	1	0.4	.	.	.	.	.	.	.	.	.	104.8	0.3	0.5
500	ACUTE BRONCHITIS	1	0.4	.	.	.	.	.	.	.	9.1	.	.	0.4	2.2
680	KIDNEY INFECTION	1	0.4	.	.	.	.	.	4.8	.	.	.	.	0.6	1.1
770	SYMP/SIGN/ILL-DF	40	15.3	78.4	1.8	5.2	5.1	7.2	14.3	17.5	27.4	21.2	104.8	14.5	1.1
840	ALL OTH EXTRNL C	5	1.9	.	.	1.7	7.7	3.6	.	.	.	.	.	2.0	0.9
780	ALL OTHER DISEAS	139	53.1	14.9	7.2	8.6	17.9	54.2	128.4	169.6	237.5	360.9	524.1	82.3	1.5

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

PHOENIX BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	1711	748.7	488.2	45.2	320.0	520.4	797.6	1172.0	1691.8	3763.0	6823.8	15771.8	918.2	1.6
790	ACCIDENTS/ADVERS	312	136.5	79.3	20.5	147.5	183.0	183.4	169.0	181.6	352.8	281.4	559.3	149.9	3.8
800	..MOTOR VEHICLE	184	80.5	25.0	6.2	101.6	138.6	99.7	101.4	90.8	132.3	105.5	223.7	85.9	3.9
810	..ALL OTH ACCDNT	128	56.0	54.2	14.4	46.0	44.5	83.7	67.6	90.8	220.5	175.9	335.6	63.9	3.6
310	DISEASE OF HEART	297	130.0	16.7	2.1	5.7	20.9	83.7	202.8	429.1	1058.4	2286.3	3915.0	177.8	0.9
350	..ISCHMC HRT DIS	176	77.0	.	.	.	5.2	43.9	107.1	297.1	764.4	1266.3	2237.1	108.5	0.8
360	....ACUT MYO INF	90	39.4	.	.	.	.	27.9	50.7	156.8	382.2	738.7	894.9	56.2	0.7
390	....OLD MI,OTHER	76	33.3	.	.	.	2.6	16.0	39.4	123.8	352.8	457.3	1342.3	45.9	0.8
370	....OTH ACUT IHD	10	4.4	.	.	.	2.6	.	16.9	16.5	29.4	70.3	.	6.4	4.9
410	..ALL OTH HRT DS	102	44.6	16.7	2.1	5.7	7.8	31.9	84.5	82.5	279.3	879.4	1566.0	58.1	1.4
330	..HYPRTNS HRT DS	8	3.5	.	.	.	2.6	.	.	33.0	14.7	70.3	.	5.0	0.9
320	..RHEUM FEVER	7	3.1	.	.	.	2.6	4.0	11.3	16.5	.	35.2	.	4.2	1.8
400	..OTH ENDOCRD DS	3	1.3	.	.	.	2.6	4.0	.	.	.	35.2	.	1.6	0.8
340	..HYPRTNS+RENAL	1	0.4	.	.	.	.	.	.	.	.	.	111.9	0.3	0.4
620	LIVER DIS/CIRRHS	150	65.6	.	.	.	68.0	223.3	208.5	158.8	147.0	35.2	111.9	87.3	7.7
150	MALIG NEOPLASMS	123	53.8	.	6.2	5.7	7.8	27.9	101.4	231.1	455.7	809.0	783.0	76.0	0.6
170	..MAL NEO-DIGEST	43	18.8	.	.	.	2.6	12.0	56.3	74.3	176.4	246.2	111.9	27.8	0.9
220	..MAL NEO-OTHER	20	8.8	.	2.1	1.9	.	8.0	22.5	24.8	58.8	105.5	223.7	11.7	0.7
180	..MAL NEO-RESPIR	19	8.3	.	.	.	.	.	11.3	66.0	88.2	105.5	.	12.7	0.3
200	..MAL NEO-GENITL	17	7.4	.	.	.	2.6	4.0	11.3	24.8	44.1	175.9	223.7	10.1	0.8
230	..LEUKEMIA	8	3.5	.	4.1	3.8	2.6	.	.	8.3	14.7	.	111.9	3.5	0.7
210	..MAL NEO-URINAR	7	3.1	.	.	.	.	.	.	16.5	44.1	70.3	.	4.7	0.9
240	..OTH NEOP LYMPH	4	1.8	.	.	.	.	.	.	8.3	14.7	70.3	.	2.6	0.4
190	..MAL NEO-BREAST	3	1.3	.	.	.	.	4.0	.	8.3	.	.	111.9	1.5	0.1
160	..MAL NEOPLS-LIP	2	0.9	.	.	.	.	.	.	.	14.7	35.2	.	1.3	0.5
510	PNEUMONIA/INFLNZ	83	36.3	25.0	.	3.8	5.2	16.0	28.2	66.0	132.3	703.5	3020.1	41.3	3.4
520	..PNEUMONIA	83	36.3	25.0	.	3.8	5.2	16.0	28.2	66.0	132.3	703.5	3020.1	41.3	3.6
830	HOMICIDE	78	34.1	16.7	4.1	47.9	52.3	51.8	45.1	24.8	29.4	.	111.9	35.5	3.4
260	DIABETES MELLITU	72	31.5	.	.	.	13.1	4.0	28.2	173.3	382.2	316.6	559.3	45.4	4.6
820	SUICIDE	69	30.2	.	2.1	65.1	65.4	19.9	16.9	8.3	.	.	.	28.2	2.5
430	CEREBROVASC DS	62	27.1	4.2	.	.	5.2	8.0	22.5	41.3	220.5	598.0	1789.7	34.2	0.9
470	..ALL OTH CBV DS	39	17.1	.	.	.	2.6	.	.	24.8	102.9	492.4	1566.0	20.3	0.8
440	..INTRCRB HMRHG	20	8.8	4.2	.	.	2.6	8.0	22.5	16.5	102.9	105.5	.	12.7	2.1
450	..CERBRL THROMB	3	1.3	.	.	.	.	.	.	.	14.7	.	223.7	1.3	0.2
640	NEPHRITIS, ET AL	35	15.3	.	.	.	.	.	39.4	49.5	147.0	246.2	559.3	21.6	4.8
670	..RENAL FAIL,ETC	30	13.1	.	.	.	.	.	22.5	49.5	132.3	211.0	559.3	18.2	4.8
660	..CHRN GLMR/NEPH	5	2.2	.	.	.	.	.	16.9	.	14.7	35.2	.	3.3	6.6
740	PERINATAL CONDIT	29	12.7	121.0	.	.	.	.	.	.	.	.	.	9.7	1.1
760	..OTH COND PERIN	21	9.2	87.6	.	.	.	.	.	.	.	.	.	7.0	1.1

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Phoenix Both Sexes (cont'd)

CODE[1]	CAUSE[2]	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
750	..BIRTH TRAUMA	8	3.5	33.4	.	.	.	.	.	.	.	.	.	2.7	1.0
730	CONGEN ANOMALIES	20	8.8	66.8	.	.	.	8.0	5.6	.	.	35.2	.	7.7	1.3
090	SEPTICEMIA	15	6.6	8.3	.	1.9	.	4.0	11.3	24.8	44.1	35.2	223.7	8.3	2.8
540	CHRON PULMON DIS	14	6.1	.	.	.	.	.	5.6	8.3	44.1	246.2	223.7	8.3	0.5
580	..OTH CHRN PULMO	13	5.7	.	.	.	.	.	5.6	8.3	29.4	246.2	223.7	7.6	0.7
550	..BRONCH,CHRON	1	0.4	.	.	.	.	.	.	.	14.7	.	.	0.7	0.7
490	OTHER ARTERY DIS	10	4.4	.	.	.	5.2	4.0	11.3	16.5	29.4	35.2	.	6.1	1.1
140	ALL OTH INF/PARA	8	3.5	.	.	1.9	.	8.0	16.9	.	14.7	35.2	.	4.8	3.2
030	TUBERCULOSIS	7	3.1	.	.	.	.	4.0	11.3	8.3	29.4	.	111.9	4.3	7.1
610	HERNIA/INTST.OBS	7	3.1	.	.	1.9	2.6	.	.	8.3	14.7	70.3	111.9	3.7	2.8
050	..OTHER TB	4	1.8	.	.	.	.	4.0	11.3	.	14.7	.	.	2.6	25.9
040	..TB-RESPIRATORY	3	1.3	.	.	.	.	.	.	8.3	14.7	.	111.9	1.7	3.4
290	MENINGITIS	6	2.6	8.3	.	.	2.6	.	.	16.5	.	.	111.9	2.7	5.5
480	ATHEROSCLEROSIS	6	2.6	.	.	.	.	.	.	8.3	14.7	.	447.4	2.6	0.5
630	CHOLEL/GALLBLDR	6	2.6	.	.	.	.	.	.	.	14.7	70.3	335.6	2.9	4.1
250	BENIGN NEO,OTHER	5	2.2	8.3	.	1.9	.	.	.	8.3	14.7	.	.	2.4	1.3
680	KIDNEY INFECTION	4	1.8	4.2	.	.	2.6	.	.	.	14.7	35.2	.	2.1	4.2
270	NUTRITION DEFICS	2	0.9	.	2.1	.	.	.	.	.	.	35.2	.	1.0	1.9
500	ACUTE BRONCHITIS	2	0.9	8.3	.	.	.	.	.	.	.	.	.	0.7	3.3
590	ULCER-STOM,DUOD	2	0.9	.	.	.	.	.	.	.	14.7	35.2	.	1.3	0.8
020	OTH INTSTNL INFS	1	0.4	4.2	.	.	.	.	.	.	.	.	.	0.3	3.3
080	MENINGOCOCCL INF	1	0.4	4.2	.	.	.	.	.	.	.	.	.	0.3	1.7
120	VIRAL HEPATITIS	1	0.4	.	.	.	2.6	.	.	.	.	.	.	0.4	1.4
280	ANEMIAS	1	0.4	.	.	.	.	4.0	.	.	.	.	.	0.6	0.6
420	..HYPRTNS+/- RNL	1	0.4	.	.	.	.	.	.	.	.	.	111.9	0.3	0.2
690	PROSTATE HYPERPL	1	0.4	.	.	.	.	.	.	.	.	35.2	.	0.6	6.1
770	SYMP/SIGN/ILL-DF	59	25.8	66.8	.	3.8	13.1	8.0	22.5	66.0	102.9	246.2	783.0	28.6	2.9
840	ALL OTH EXTRNL C	12	5.3	.	.	9.6	13.1	.	5.6	8.3	.	.	.	5.2	3.5
780	ALL OTHER DISEAS	210	91.9	45.9	8.2	23.0	57.5	139.6	219.7	156.8	483.1	633.1	1901.6	116.2	3.4

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

PHOENIX FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	645	554.9	464.0	33.2	160.5	311.0	583.3	776.4	1175.9	2964.2	4926.4	12782.0	862.9	1.6
310	DISEASE OF HEART	120	103.2	8.4	4.1	7.6	15.3	61.4	97.0	344.9	808.4	1663.5	3383.5	133.0	1.0
350	..ISCHMC HRT DIS	66	56.8	.	.	.	5.1	23.0	43.1	219.5	565.9	831.7	1879.7	75.2	0.8
360	....ACUT MYO INF	32	27.5	.	.	.	.	15.4	.	172.5	215.6	511.8	563.9	37.4	0.7
390	....OLD MI,OTHER	30	25.8	.	.	.	.	7.7	43.1	31.4	323.4	255.9	1315.8	33.3	0.8
370	....OTH ACUT IHD	4	3.4	.	.	.	5.1	.	.	15.7	26.9	64.0	.	4.5	5.7
410	..ALL OTH HRT DS	43	37.0	8.4	4.1	7.6	5.1	30.7	43.1	62.7	215.6	703.8	1315.8	45.4	1.5
320	..RHEUM FEVER	5	4.3	.	.	.	.	7.7	10.8	31.4	.	64.0	.	5.9	2.2
330	..HYPRTNS HRT DS	5	4.3	.	.	.	5.1	.	.	31.4	26.9	64.0	.	5.8	1.1
340	..HYPRTNS+RENAL	1	0.9	.	.	.	.	.	.	.	.	.	188.0	0.6	0.9
790	ACCIDENTS/ADVERS	87	74.8	50.6	12.4	76.4	122.4	145.8	53.9	62.7	107.8	64.0	188.0	78.9	3.9
800	..MOTOR VEHICLE	61	52.5	8.4	4.1	68.8	112.2	84.4	32.3	62.7	.	64.0	.	54.1	4.8
810	..ALL OTH ACCDNT	26	22.4	42.2	8.3	7.6	10.2	61.4	21.6	.	107.8	.	188.0	24.8	2.7
150	MALIG NEOPLASMS	58	49.9	.	4.1	7.6	5.1	30.7	86.3	188.1	404.2	639.8	939.8	66.4	0.6
170	..MAL NEO-DIGEST	21	18.1	.	.	.	.	7.7	43.1	47.0	188.6	319.9	188.0	25.4	1.0
200	..MAL NEO-GENITL	11	9.5	.	.	.	5.1	7.7	21.6	31.4	26.9	128.0	375.9	11.7	0.9
220	..MAL NEO-OTHER	9	7.7	.	.	.	.	7.7	10.8	31.4	80.8	64.0	188.0	10.5	0.8
180	..MAL NEO-RESPIR	6	5.2	.	.	.	.	.	10.8	47.0	53.9	.	.	7.6	0.4
230	..LEUKEMIA	4	3.4	.	4.1	7.6	.	.	.	15.7	.	.	.	3.3	0.8
190	..MAL NEO-BREAST	3	2.6	.	.	.	.	7.7	.	15.7	.	.	188.0	2.9	0.1
210	..MAL NEO-URINAR	3	2.6	.	.	.	.	.	.	.	26.9	128.0	.	3.6	1.2
240	..OTH NEOP LYMPH	1	0.9	.	.	.	.	.	.	.	26.9	.	.	1.3	0.2
620	LIVER DIS/CIRRHS	54	46.5	.	.	.	35.7	176.5	140.2	125.4	80.8	.	.	60.5	8.2
260	DIABETES MELLITU	44	37.9	.	.	.	5.1	.	32.3	235.2	404.2	383.9	751.9	52.3	5.4
510	PNEUMONIA/INFLNZ	33	28.4	33.7	.	.	10.2	7.7	32.3	31.4	107.8	511.8	1691.7	31.7	3.5
520	..PNEUMONIA	33	28.4	33.7	.	.	10.2	7.7	32.3	31.4	107.8	511.8	1691.7	31.7	3.7
430	CEREBROVASC DS	27	23.2	.	.	.	.	.	21.6	47.0	215.6	447.9	1315.8	29.2	0.8
470	..ALL OTH CBV DS	19	16.3	.	.	.	.	.	.	31.4	107.8	383.9	1315.8	19.0	0.8
440	..INTRCRB HMRHG	8	6.9	.	.	.	.	.	21.6	15.7	107.8	64.0	.	10.1	1.8
830	HOMICIDE	20	17.2	25.3	.	15.3	25.5	30.7	43.1	.	.	.	.	18.3	4.2
640	NEPHRITIS, ET AL	17	14.6	.	.	.	.	.	43.1	15.7	188.6	255.9	188.0	20.7	5.7
670	..RENAL FAIL,ETC	15	12.9	.	.	.	.	.	32.3	15.7	188.6	191.9	188.0	18.3	5.9
660	..CHRN GLMR/NEPH	2	1.7	.	.	.	.	.	10.8	.	.	64.0	.	2.4	4.8
740	PERINATAL CONDIT	15	12.9	126.5	.	.	.	.	.	.	.	.	.	10.0	1.2
760	..OTH COND PERIN	11	9.5	92.8	.	.	.	.	.	.	.	.	.	7.3	1.3
750	..BIRTH TRAUMA	4	3.4	33.7	.	.	.	.	.	.	.	.	.	2.7	1.2
820	SUICIDE	14	12.0	.	4.1	30.6	20.4	7.7	.	.	.	.	.	10.7	1.9
730	CONGEN ANOMALIES	12	10.3	75.9	.	.	.	7.7	10.8	.	.	64.0	.	9.5	1.7
090	SEPTICEMIA	6	5.2	8.4	.	3.8	.	.	10.8	31.4	.	.	188.0	5.7	2.4
480	ATHEROSCLEROSIS	5	4.3	.	.	.	.	.	.	.	26.9	.	751.9	3.8	0.8

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Phoenix Females (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
490	OTHER ARTERY DIS	5	4.3	.	.	.	5.1	7.7	10.8	15.7	26.9	.	.	5.7	1.9
340	CHRON PULMON DIS	5	4.3	.	.	.	.	.	.	.	53.9	191.9	.	6.1	0.6
580	..OTH CHRN PULMO	4	3.4	.	.	.	.	.	.	.	26.9	191.9	.	4.8	0.8
550	..BRONCH,CHRON	1	0.9	.	.	.	.	.	.	.	26.9	.	.	1.3	2.2
290	MENINGITIS	4	3.4	16.9	.	.	.	.	.	15.7	.	.	188.0	3.2	8.0
030	TUBERCULOSIS	3	2.6	.	.	.	.	7.7	10.8	.	26.9	.	.	3.6	9.1
140	ALL OTH INF/PARA	3	2.6	.	.	.	.	.	32.3	.	.	.	.	3.7	2.9
250	BENIGN NEO,OTHER	3	2.6	8.4	.	.	.	.	.	15.7	26.9	.	.	3.2	1.9
610	HERNIA/INTST.OBS	3	2.6	.	.	.	5.1	.	.	.	26.9	.	188.0	2.8	2.1
050	..OTHER TB	2	1.7	.	.	.	.	7.7	10.8	.	.	.	.	2.3	23.1
040	..TB-RESPIRATORY	1	0.9	.	.	.	.	.	.	.	26.9	.	.	1.3	4.4
630	CHOLEL/GALLBLDR	2	1.7	.	.	.	.	.	.	.	.	64.0	188.0	1.8	2.5
680	KIDNEY INFECTION	2	1.7	8.4	.	.	.	.	.	.	26.9	.	.	2.0	3.3
420	..HYPRTNS+/- RNL	1	0.9	.	.	.	.	.	.	.	.	.	188.0	0.6	0.4
770	SYMP/SIGN/ILL-DF	15	12.9	50.6	.	3.8	10.2	.	10.8	15.7	26.9	64.0	188.0	12.0	1.7
840	ALL OTH EXTRNL C	4	3.4	.	.	3.8	10.2	.	10.8	.	.	.	.	3.6	4.0
780	ALL OTHER DISEAS	83	71.4	50.6	8.3	11.5	40.8	99.8	129.4	31.4	404.2	575.8	2443.6	83.8	3.0

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

PHOENIX MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
			ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	1066	949.3	512.0	57.0	480.4	740.7	1029.4	1604.5	2265.2	4721.9	9140.6	20221.6	1201.6	1.6
790	ACCIDENTS/ADVERS	225	200.4	107.3	28.5	219.1	246.9	224.1	295.0	313.6	646.8	546.9	1108.0	227.2	3.8
800	..MOTOR VEHICLE	123	109.5	41.3	8.1	134.5	166.4	116.2	177.0	122.0	291.1	156.2	554.0	120.7	3.7
810	..ALL OTH ACCDNT	102	90.8	66.1	20.4	84.5	80.5	107.9	118.0	191.7	355.8	390.6	554.0	106.5	3.9
310	DISEASE OF HEART	177	157.6	24.8	.	3.8	26.8	107.9	318.5	522.7	1358.3	3046.9	4709.1	229.4	0.8
350	..ISCHMC HRT DIS	110	98.0	.	.	.	5.4	66.4	177.0	383.3	1002.6	1796.9	2770.1	146.9	0.7
360	....ACUT MYO INF	58	51.7	.	.	.	.	41.5	106.2	139.4	582.1	1015.6	1385.0	77.8	0.6
390	....OLD MI,OTHER	46	41.0	.	.	.	5.4	24.9	35.4	226.5	388.1	703.1	1385.0	60.5	0.7
370	....OTH ACUT IHD	6	5.3	.	.	.	.	.	35.4	17.4	32.3	78.1	.	8.5	4.1
410	..ALL OTH HRT DS	59	52.5	24.8	.	3.8	10.7	33.2	129.8	104.5	355.8	1095.7	1939.1	72.8	1.4
330	..HYPRTNS HRT DS	3	2.7	.	.	.	.	.	.	34.8	.	78.1	.	4.1	0.6
400	..OTH ENDOCRD DS	3	2.7	.	.	.	5.4	8.3	.	.	.	78.1	.	3.3	1.3
320	..RHEUM FEVER	2	1.8	.	.	.	5.4	.	11.8	.	.	.	.	2.3	1.3
620	LIVER DIS/CIRRHS	96	85.5	.	.	.	102.0	273.9	283.2	191.7	226.4	78.1	277.0	116.9	7.3
150	MALIG NEOPLASMS	65	57.9	.	8.1	3.8	10.7	24.9	118.0	278.8	517.5	1015.6	554.0	87.1	0.5
170	..MAL NEO-DIGEST	22	19.6	.	.	.	5.4	16.6	70.8	104.5	161.7	156.2	.	30.6	0.7
180	..MAL NEO-RESPIR	13	11.6	.	.	.	.	.	11.8	87.1	129.4	234.4	.	18.6	0.3
220	..MAL NEO-OTHER	11	9.8	.	4.1	3.8	.	8.3	35.4	17.4	32.3	156.2	277.0	13.0	0.6
200	..MAL NEO-GENITL	6	5.3	.	.	.	.	.	.	17.4	64.7	234.4	.	8.4	0.6
210	..MAL NEO-URINAR	4	3.6	.	.	.	.	.	.	34.8	64.7	.	.	6.0	0.7
230	..LEUKEMIA	4	3.6	.	4.1	.	5.4	.	.	.	32.3	.	277.0	3.8	0.6
240	..OTH NEOP LYMPH	3	2.7	.	.	.	.	.	.	17.4	.	156.2	.	4.0	0.5
160	..MAL NEOPLS-LIP	2	1.8	.	.	.	.	.	.	.	32.3	78.1	.	2.8	0.6
830	HOMICIDE	58	51.7	8.3	8.1	80.7	80.5	74.7	47.2	52.3	64.7	.	277.0	53.5	3.2
820	SUICIDE	55	49.0	.	.	99.9	112.7	33.2	35.4	17.4	.	.	.	46.2	2.6
510	PNEUMONIA/INFLNZ	50	44.5	16.5	.	7.7	.	24.9	23.6	104.5	161.7	937.5	4986.1	52.6	3.2
520	..PNEUMONIA	50	44.5	16.5	.	7.7	.	24.9	23.6	104.5	161.7	937.5	4986.1	52.6	3.3
430	CEREBROVASC DS	35	31.2	8.3	.	.	10.7	16.6	23.6	34.8	226.4	781.3	2493.1	40.0	1.0
470	..ALL OTH CBV DS	20	17.8	.	.	.	5.4	.	.	17.4	97.0	625.0	1939.1	21.8	0.8
440	..INTRCRB HMRHG	12	10.7	8.3	.	.	5.4	16.6	23.6	17.4	97.0	156.2	.	15.3	2.4
450	..CEREBRL THROMB	3	2.7	.	.	.	.	.	.	.	32.3	.	554.0	2.9	0.4
260	DIABETES MELLITU	28	24.9	.	.	.	21.5	8.3	23.6	104.5	355.8	234.4	277.0	37.5	3.8
640	NEPHRITIS, ET AL	18	16.0	.	.	.	.	.	35.4	87.1	97.0	234.4	1108.0	22.5	4.0
670	..RENAL FAIL,ETC	15	13.4	.	.	.	.	.	11.8	87.1	64.7	234.4	1108.0	18.1	3.7
660	..CHRN GLMR/NEPH	3	2.7	.	.	.	.	.	23.6	.	32.3	.	.	4.4	7.3
740	PERINATAL CONDIT	14	12.5	115.6	.	.	.	.	.	.	.	.	.	9.4	0.9
760	..OTH COND PERIN	10	8.9	82.6	.	.	.	.	.	.	.	.	.	6.7	1.0
750	..BIRTH TRAUMA	4	3.6	33.0	.	.	.	.	.	.	.	.	.	2.7	0.8
090	SEPTICEMIA	9	8.0	8.3	.	.	.	8.3	11.8	17.4	97.0	78.1	277.0	11.3	3.3

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Phoenix Males (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
540	CHRON PULMON DIS	9	8.0	.	.	.	.	.	11.8	17.4	32.3	312.5	554.0	10.8	0.4
580	..OTH CHRN PULMO	9	8.0	.	.	.	.	.	11.8	17.4	32.3	312.5	554.0	10.8	0.6
730	CONGEN ANOMALIES	8	7.1	57.8	.	.	.	8.3	.	.	.	.	.	5.8	1.0
140	ALL OTH INF/PARA	5	4.5	.	.	3.8	.	16.6	.	.	32.3	78.1	.	5.8	3.4
490	OTHER ARTERY DIS	5	4.5	.	.	.	5.4	.	11.8	17.4	32.3	78.1	.	6.5	0.8
030	TUBERCULOSIS	4	3.6	.	.	.	.	.	11.8	17.4	32.3	.	277.0	5.1	5.1
610	HERNIA/INTST.OBS	4	3.6	.	.	3.8	.	.	.	17.4	.	156.2	.	4.7	3.6
630	CHOLEL/GALLBLDR	4	3.6	.	.	.	.	.	.	.	32.3	78.1	554.0	4.2	5.2
040	..TB-RESPIRATORY	2	1.8	.	.	.	.	.	.	17.4	.	.	277.0	2.1	2.6
050	..OTHER TB	2	1.8	.	.	.	.	.	11.8	.	32.3	.	.	3.0	29.7
250	BENIGN NEO,OTHER	2	1.8	8.3	.	3.8	.	.	.	.	.	.	.	1.4	0.6
270	NUTRITION DEFICS	2	1.8	.	4.1	.	.	.	.	.	.	78.1	.	2.0	4.0
290	MENINGITIS	2	1.8	.	.	.	5.4	.	.	17.4	.	.	.	2.3	3.3
500	ACUTE BRONCHITIS	2	1.8	16.5	.	.	.	.	.	.	.	.	.	1.3	6.7
590	ULCER-STOM,DUOD	2	1.8	.	.	.	.	.	.	.	32.3	78.1	.	2.8	1.2
680	KIDNEY INFECTION	2	1.8	.	.	.	5.4	.	.	.	.	78.1	.	2.1	4.3
020	OTH INTSTNL INFS	1	0.9	8.3	.	.	.	.	.	.	.	.	.	0.7	6.7
080	MENINGOCOCCL INF	1	0.9	8.3	.	.	.	.	.	.	.	.	.	0.7	3.3
120	VIRAL HEPATITIS	1	0.9	.	.	.	5.4	.	.	.	.	.	.	0.9	2.1
280	ANEMIAS	1	0.9	.	.	.	.	8.3	.	.	.	.	.	1.2	1.2
480	ATHEROSCLEROSIS	1	0.9	.	.	.	.	.	.	17.4	.	.	.	1.4	0.2
690	PROSTATE HYPERPL	1	0.9	.	.	.	.	.	.	.	.	78.1	.	1.3	3.2
770	SYMP/SIGN/ILL-DF	44	39.2	82.6	.	3.8	16.1	16.6	35.4	122.0	194.0	468.7	1662.0	47.5	3.7
840	ALL OTH EXTRNL C	8	7.1	.	.	15.4	16.1	.	.	17.4	.	.	.	6.8	3.1
780	ALL OTHER DISEAS	127	113.1	41.3	8.1	34.6	75.1	182.6	318.5	296.2	582.1	703.1	1108.0	153.0	3.6

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

PORTLAND BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	1363	586.9	524.9	15.7	234.5	384.7	578.4	937.8	1722.7	2843.2	5888.7	11282.1	749.8	1.3
790	ACCIDENTS/ADVERS	273	117.6	57.9	13.8	156.4	182.2	169.7	130.7	171.4	137.6	72.3	.	125.6	3.2
800	..MOTOR VEHICLE	166	71.5	28.9	9.8	108.7	113.9	100.3	73.9	77.1	61.1	.	.	74.0	3.4
810	..ALL OTH ACCDNT	107	46.1	28.9	3.9	47.7	68.3	69.4	56.8	94.3	76.4	72.3	.	51.6	2.9
310	DISEASE OF HEART	271	116.7	4.1	.	1.9	12.7	57.8	193.2	462.8	1146.4	1806.4	4615.4	170.3	0.9
350	..ISCHMC HRT DIS	184	79.2	.	.	.	7.6	38.6	102.3	300.0	901.9	1228.3	3205.1	116.5	0.8
360	....ACUT MYO INF	119	51.2	.	.	.	5.1	30.8	68.2	248.5	626.7	614.2	1282.1	77.6	0.9
390	....OLD MI,OTHER	64	27.6	.	.	.	2.5	7.7	34.1	51.4	275.1	578.0	1923.1	38.3	0.6
370	....OTH ACUT IHD	1	0.4	.	.	.	.	.	.	.	.	36.1	.	0.6	0.5
410	..ALL OTH HRT DS	71	30.6	4.1	.	.	5.1	19.3	68.2	137.1	198.7	341.9	897.4	44.4	1.1
330	..HYPRTNS HRT DS	7	3.0	.	.	.	.	.	5.7	17.1	30.6	36.1	128.2	4.5	0.8
320	..RHEUM FEVER	6	2.6	.	.	1.9	.	.	17.1	8.6	15.3	.	.	3.8	1.6
400	..OTH ENDOCRD DS	3	1.3	.	.	.	.	.	.	.	.	.	384.6	1.1	0.5
620	LIVER DIS/CIRRHS	118	50.8	.	.	.	35.4	119.5	210.3	222.8	91.7	108.4	128.2	71.7	6.3
150	MALIG NEOPLASMS	115	49.5	4.1	.	1.9	12.7	11.6	85.3	231.4	428.0	1017.7	769.2	73.9	0.6
170	..MAL NEO-DIGEST	41	17.7	.	.	.	.	3.9	34.1	77.1	137.6	433.5	512.8	26.3	0.8
180	..MAL NEO-RESPIR	24	10.3	.	.	.	.	3.9	11.4	77.1	122.3	144.5	.	16.5	0.5
200	..MAL NEO-GENITL	14	6.0	.	.	.	2.5	.	5.7	17.1	45.9	180.6	256.4	8.5	0.6
220	..MAL NEO-OTHER	11	4.7	.	.	1.9	2.5	.	.	17.1	30.6	180.6	.	6.7	0.4
190	..MAL NEO-BREAST	10	4.3	.	.	.	.	.	28.4	25.7	15.3	36.1	.	6.8	0.5
240	..OTH NEOP LYMPH	7	3.0	.	.	.	.	.	5.7	8.6	45.9	72.3	.	4.8	0.7
210	..MAL NEO-URINAR	4	1.7	.	.	.	5.1	.	.	.	30.6	.	.	2.3	0.5
230	..LEUKEMIA	4	1.7	4.1	.	.	2.5	3.9	.	8.6	.	.	.	2.0	0.4
430	CEREBROVASC DS	66	28.4	.	.	.	5.1	11.6	39.8	102.8	152.9	758.7	1410.3	39.8	1.0
470	..ALL OTH CBV DS	49	21.1	.	.	.	2.5	11.6	22.7	77.1	107.0	578.0	1153.8	29.3	1.2
440	..INTRCRB HMRHG	11	4.7	.	.	.	2.5	.	11.4	25.7	30.6	108.4	.	7.2	1.2
450	..CEREBL THROMB	6	2.6	.	.	.	.	.	5.7	.	15.3	72.3	256.4	3.4	0.5
820	SUICIDE	51	22.0	.	.	43.9	45.6	27.0	11.4	8.6	.	.	.	21.1	1.8
260	DIABETES MELLITU	39	16.8	.	.	.	7.6	19.3	28.4	68.6	122.3	325.1	128.2	24.7	2.5
510	PNEUMONIA/INFLNZ	39	16.8	4.1	.	.	5.1	3.9	17.1	25.7	137.6	325.1	1410.3	22.0	1.8
520	..PNEUMONIA	37	15.9	4.1	.	.	5.1	3.9	17.1	25.7	122.3	289.0	1410.3	20.6	1.8
530	..INFLUENZA	2	0.9	.	.	.	.	.	.	.	15.3	36.1	.	1.4	2.3
740	PERINATAL CONDIT	36	15.5	148.8	.	.	.	.	.	.	.	.	.	11.9	1.3
630	HOMICIDE	36	15.5	4.1	.	15.3	27.8	34.7	22.7	25.7	.	.	.	17.2	1.7
760	..OTH COND PERIN	21	9.0	86.8	.	.	.	.	.	.	.	.	.	6.9	1.1
750	..BIRTH TRAUMA	15	6.5	62.0	.	.	.	.	.	.	.	.	.	5.0	1.8
540	CHRON PULMON DIS	20	8.6	.	.	.	.	.	.	34.3	122.3	144.5	512.8	12.6	0.8
580	..OTH CHRN PULMO	19	8.2	.	.	.	.	.	.	34.3	107.0	144.5	512.8	11.9	1.1
560	..EMPHYSEMA	1	0.4	.	.	.	.	.	.	.	15.3	.	.	0.7	0.2

[a] Equivalence to ICD-9 codes available from IHS.

[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Portland Both Sexes (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-	RATIO TO
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	ADJUST RATE	U.S. ALL-RACES AGE-ADJUSTED RATES
640	NEPHRITIS, ET AL	19	8.2	.	.	.	.	15.4	11.4	25.7	76.4	108.4	256.4	11.8	2.6
670	..RENAL FAIL,ETC	16	6.9	.	.	.	.	11.6	5.7	17.1	76.4	108.4	256.4	9.9	2.6
660	..CHRN GLMR/NEPH	3	1.3	.	.	.	.	3.9	5.7	8.6	.	.	.	1.9	3.8
730	CONGEN ANOMALIES	16	6.9	62.0	.	.	.	.	.	.	15.3	.	.	5.7	1.0
090	SEPTICEMIA	10	4.3	4.1	.	.	.	3.9	17.1	25.7	15.3	.	128.2	6.0	2.1
630	CHOLEL/GALLBLDR	6	2.6	.	.	.	.	3.9	.	.	45.9	72.3	.	4.0	5.7
420	..HYPRTNS+/- RNL	5	2.2	.	.	.	.	3.9	5.7	8.6	.	36.1	128.2	2.9	1.5
590	ULCER-STOM,DUOD	5	2.2	.	2.0	.	.	.	.	8.6	.	36.1	256.4	2.4	1.4
480	ATHEROSCLEROSIS	4	1.7	.	.	.	.	.	.	.	15.3	36.1	256.4	2.1	0.4
250	BENIGN NEO,OTHER	3	1.3	.	.	.	.	.	.	17.1	.	.	128.2	1.7	0.9
270	NUTRITION DEFICS	3	1.3	.	.	.	.	.	.	.	15.3	.	256.4	1.5	2.9
290	MENINGITIS	3	1.3	4.1	.	.	.	3.9	5.7	.	.	.	.	1.5	3.1
490	OTHER ARTERY DIS	3	1.3	.	.	.	.	.	.	.	15.3	72.3	.	2.0	0.4
610	HERNIA/INTST.OBS	3	1.3	.	.	.	.	.	.	.	15.3	72.3	.	2.0	1.5
680	KIDNEY INFECTION	3	1.3	.	.	.	.	.	5.7	.	.	72.3	.	1.9	3.8
030	TUBERCULOSIS	2	0.9	.	.	.	.	.	5.7	8.6	.	.	.	1.4	2.3
040	..TB-RESPIRATORY	2	0.9	.	.	.	.	.	5.7	8.6	.	.	.	1.4	2.7
140	ALL OTH INF/PARA	2	0.9	4.1	.	.	.	.	.	.	.	36.1	.	1.0	0.6
020	OTH INTSTNL INFS	1	0.4	4.1	.	.	.	.	.	.	.	.	.	0.3	3.3
500	ACUTE BRONCHITIS	1	0.4	4.1	.	.	.	.	.	.	.	.	.	0.3	1.7
690	PROSTATE HYPERPL	1	0.4	.	.	.	.	.	.	8.6	.	.	.	0.7	6.9
770	SYMP/SIGN/ILL-DF	53	22.8	181.8	.	.	.	3.9	5.7	17.1	30.6	36.1	256.4	20.0	2.8
840	ALL OTH EXTRNL C	10	4.3	4.1	.	1.9	2.5	11.6	22.7	.	.	.	.	5.4	3.6
780	ALL OTHER DISEAS	146	62.9	33.1	.	13.3	48.1	77.1	119.4	248.5	259.9	722.5	641.0	84.5	2.3

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

PORTLAND FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	550	470.5	421.3	8.0	141.1	257.0	366.8	719.7	1175.5	2348.9	6189.6	9722.2	588.6	1.4
310	DISEASE OF HEART	113	96.7	8.4	.	3.8	9.9	30.6	123.7	235.1	859.4	1869.8	4166.7	129.7	1.0
350	..ISCHMC HRT DIS	75	64.2	.	.	.	9.9	15.3	45.0	117.5	716.1	1160.5	3373.0	85.4	0.9
360	....ACUT MYO INF	46	39.3	.	.	.	4.9	15.3	33.7	100.8	458.3	515.8	1984.1	53.1	1.1
390	....OLD MI,OTHER	29	24.8	.	.	.	4.9	.	11.2	16.8	257.8	644.7	1388.9	32.3	0.7
410	..ALL OTH HRT DS	28	24.0	8.4	.	.	.	15.3	56.2	100.8	85.9	644.7	198.4	33.7	1.1
320	..RHEUM FEVER	4	3.4	.	.	3.8	.	.	22.5	16.8	.	.	.	4.6	1.7
330	..HYPRTNS HRT DS	4	3.4	.	.	.	.	.	.	.	57.3	64.5	198.4	4.6	0.9
400	..OTH ENDOCRD DS	2	1.7	.	.	.	.	.	.	.	.	.	396.8	1.3	0.8
790	ACCIDENTS/ADVERS	84	71.9	59.0	8.0	114.4	79.1	68.8	101.2	84.0	143.2	64.5	.	76.1	3.7
800	..MOTOR VEHICLE	57	48.8	42.1	4.0	91.5	64.3	30.6	67.5	16.8	85.9	.	.	49.0	4.3
810	..ALL OTH ACCDNT	27	23.1	16.9	4.0	22.9	14.8	38.2	33.7	67.2	57.3	64.5	.	27.1	3.0
150	MALIG NEOPLASMS	56	47.9	.	.	.	9.9	15.3	90.0	151.1	343.7	1225.0	793.7	67.6	0.6
170	..MAL NEO-DIGEST	16	13.7	.	.	.	.	.	11.2	50.4	114.6	386.8	396.8	19.2	0.7
190	..MAL NEO-BREAST	10	8.6	.	.	.	.	.	56.2	50.4	28.6	64.5	.	13.0	0.6
200	..MAL NEO-GENITL	9	7.7	.	.	.	4.9	.	11.2	.	28.6	257.9	396.8	9.5	0.7
180	..MAL NEO-RESPIR	7	6.0	.	.	.	.	7.6	.	16.8	85.9	128.9	.	8.9	0.5
220	..MAL NEO-OTHER	7	6.0	.	.	.	4.9	.	.	16.8	28.6	257.9	.	8.2	0.6
240	..OTH NEOP LYMPH	5	4.3	.	.	.	.	.	11.2	.	57.3	128.9	.	6.4	1.1
230	..LEUKEMIA	2	1.7	.	.	.	.	7.6	.	16.8	.	.	.	2.4	0.6
620	LIVER DIS/CIRRHS	55	47.0	.	.	.	39.5	107.0	157.4	201.5	114.6	193.4	.	64.5	8.7
430	CEREBROVASC DS	34	29.1	.	.	.	4.9	22.9	33.7	100.8	114.6	838.2	793.7	39.2	1.1
470	..ALL OTH CBV DS	29	24.8	.	.	.	.	22.9	22.5	100.8	114.6	709.2	595.2	34.1	1.4
450	..CEREBL THROMB	3	2.6	.	.	.	.	.	11.2	.	.	64.5	198.4	3.1	0.5
440	..INTRCRB HMRRG	2	1.7	.	.	.	4.9	.	.	.	.	64.5	.	2.0	0.4
510	PNEUMONIA/INFLNZ	20	17.1	.	.	.	4.9	7.6	.	16.8	143.2	322.4	1388.9	20.6	2.2
520	..PNEUMONIA	18	15.4	.	.	.	4.9	7.6	.	16.8	114.6	257.9	1388.9	18.1	2.1
530	..INFLUENZA	2	1.7	.	.	.	.	.	.	.	28.6	64.5	.	2.6	4.3
260	DIABETES MELLITU	15	12.8	.	.	.	4.9	.	.	50.4	85.9	451.3	198.4	17.8	1.9
640	NEPHRITIS, ET AL	14	12.0	.	.	.	.	15.3	11.2	33.6	114.6	193.4	396.8	16.5	4.6
830	HOMICIDE	14	12.0	.	.	3.8	29.7	30.6	.	50.4	.	.	.	13.8	3.2
670	..RENAL FAIL,ETC	13	11.1	.	.	.	.	15.3	11.2	16.8	114.6	193.4	396.8	15.2	4.9
660	..CHRN GLMR/NEPH	1	0.9	.	.	.	.	.	.	16.8	.	.	.	1.3	2.6
740	PERINATAL CONDIT	12	10.3	101.1	.	.	.	.	.	.	.	.	.	8.0	1.0
750	..BIRTH TRAUMA	6	5.1	50.6	.	.	.	.	.	.	.	.	.	4.0	1.7
760	..OTH COND PERIN	6	5.1	50.6	.	.	.	.	.	.	.	.	.	4.0	0.7
820	SUICIDE	8	6.8	.	.	15.3	19.8	.	.	.	.	.	.	6.1	1.1
540	CHRON PULMON DIS	7	6.0	.	.	.	.	.	.	33.6	28.6	128.9	396.8	7.7	0.8
580	..OTH CHRN PULMO	7	6.0	.	.	.	.	.	.	33.6	28.6	128.9	396.8	7.7	1.3

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Portland Females (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
090	SEPTICEMIA	6	5.1	.	.	.	.	7.6	22.5	16.8	28.6	.	198.4	7.0	2.9
730	CONGEN ANOMALIES	6	5.1	30.6	.	.	.	.	.	.	.	.	.	4.0	0.7
420	..HYPRTNS+/- RNL	4	3.4	.	.	.	.	.	11.2	16.8	.	64.5	198.4	4.4	2.6
630	CHOLEL/GALLBLDR	3	2.6	.	.	.	.	.	.	.	57.3	64.5	.	4.0	5.7
480	ATHEROSCLEROSIS	2	1.7	.	.	.	.	.	.	.	28.6	.	198.4	2.1	0.4
390	ULCER-STOM,DUOD	2	1.7	.	.	.	.	.	.	16.8	.	64.5	.	2.5	2.1
610	HERNIA/INTST.OBS	2	1.7	.	.	.	.	.	.	.	.	128.9	.	2.3	1.8
680	KIDNEY INFECTION	2	1.7	.	.	.	.	.	11.2	.	.	64.5	.	2.5	4.1
030	TUBERCULOSIS	1	0.9	.	.	.	.	.	11.2	.	.	.	.	1.3	3.2
040	..TB-RESPIRATORY	1	0.9	.	.	.	.	.	11.2	.	.	.	.	1.3	4.3
140	ALL OTH INF/PARA	1	0.9	8.4	.	.	.	.	.	.	.	.	.	0.7	0.3
270	NUTRITION DEFICS	1	0.9	.	.	.	.	.	.	.	.	.	198.4	0.7	1.6
490	OTHER ARTERY DIS	1	0.9	.	.	.	.	.	.	.	.	64.5	.	1.2	0.4
500	ACUTE BRONCHITIS	1	0.9	8.4	.	.	.	.	.	.	.	.	.	0.7	6.7
770	SYMP/SIGN/ILL-DF	22	18.8	151.7	.	.	.	.	.	16.8	28.6	.	396.8	16.0	2.3
840	ALL OTH EXTRNL C	3	2.6	8.4	.	.	4.9	7.6	.	.	.	.	.	2.5	2.8
780	ALL OTHER DISEAS	61	52.2	25.3	.	3.8	49.4	53.5	146.2	151.1	257.8	451.3	396.8	69.1	2.4

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

PORTLAND MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	813	704.9	624.5	23.3	328.0	518.6	794.1	1160.7	2293.0	3407.6	5505.3	14130.4	921.2	1.2
790	ACCIDENTS/ADVERS	189	163.9	56.8	19.5	198.3	290.4	272.5	160.9	262.6	131.1	82.2	.	176.2	2.9
800	..MOTOR VEHICLE	109	94.5	16.2	15.6	125.8	166.0	171.3	80.4	140.0	32.8	.	.	99.5	3.0
810	..ALL OTH ACCDNT	80	69.4	40.6	3.9	72.5	124.5	101.2	80.4	122.5	98.3	82.2	.	76.6	2.8
310	DISEASE OF HEART	158	137.0	.	.	.	15.6	85.6	264.3	700.2	1474.4	1725.6	5434.8	215.5	0.8
350	..ISCHMC HRT DIS	109	94.5	.	.	.	5.2	62.3	160.9	490.1	1114.0	1314.7	2898.6	150.8	0.7
360	....ACUT MYO INF	73	63.3	.	.	.	5.2	46.7	103.4	402.6	819.1	739.5	.	104.1	0.9
390	....OLD MI,OTHER	35	30.3	.	.	.	.	15.6	57.5	87.5	294.9	493.0	2898.6	45.4	0.6
370	....OTH ACUT IHD	1	0.9	.	.	.	.	.	.	.	.	82.2	.	1.3	0.6
410	..ALL OTH HRT DS	43	37.3	.	.	.	10.4	23.4	80.4	175.0	327.7	410.8	2173.9	56.6	1.1
330	..HYPRTNS HRT DS	3	2.6	.	.	.	.	.	11.5	35.0	.	.	.	4.3	0.7
320	..RHEUM FEVER	2	1.7	.	.	.	.	.	11.5	.	32.8	.	.	3.0	1.6
400	..OTH ENDOCRD DS	1	0.9	.	.	.	.	.	.	.	.	.	362.3	0.9	0.3
620	LIVER DIS/CIRRHS	63	54.6	.	.	.	31.1	132.3	264.3	245.1	65.5	.	362.3	79.2	5.0
150	MALIG NEOPLASMS	59	51.2	8.1	.	3.8	15.6	7.8	80.4	315.1	524.2	821.7	724.6	80.7	0.3
170	..MAL NEO-DIGEST	25	21.7	.	.	.	.	7.8	57.5	105.0	163.8	493.0	724.6	34.3	0.8
180	..MAL NEO-RESPIR	17	14.7	.	.	.	.	.	23.0	140.0	163.8	164.3	.	24.8	0.4
200	..MAL NEO-GENITL	5	4.3	.	.	.	.	.	.	35.0	65.3	82.2	.	7.4	0.5
210	..MAL NEO-URINAR	4	3.5	.	.	.	10.4	.	.	.	65.5	.	.	4.8	0.6
220	..MAL NEO-OTHER	4	3.5	.	.	3.8	.	.	.	17.5	32.8	82.2	.	5.0	0.3
230	..LEUKEMIA	2	1.7	8.1	.	.	5.2	.	.	.	.	.	.	1.5	0.2
240	..OTH NEOP LYMPH	2	1.7	.	.	.	.	.	.	17.5	32.8	.	.	3.0	0.4
820	SUICIDE	43	37.3	.	.	72.5	72.6	54.5	23.0	17.5	.	.	.	36.3	2.0
430	CEREBROVASC DS	32	27.7	.	.	.	5.2	.	46.0	105.0	196.6	657.4	[illegible]	41.2	1.0
470	..ALL OTH CBV DS	20	17.3	.	.	.	5.2	.	23.0	52.5	98.3	410.8	2173.9	24.5	0.9
440	..INTRCRB HMRHG	9	7.8	.	.	.	.	.	23.0	52.5	65.5	164.3	.	12.9	2.0
450	..CERBRL THROMB	3	2.6	.	.	.	.	.	.	.	32.8	82.2	362.3	3.8	0.5
260	DIABETES MELLITU	24	20.8	.	.	.	10.4	38.9	57.5	87.5	163.8	164.3	.	31.7	3.2
740	PERINATAL CONDIT	24	20.8	194.6	.	.	.	.	.	.	.	.	.	15.8	1.5
760	..OTH COND PERIN	15	13.0	121.7	.	.	.	.	.	.	.	.	.	9.9	1.4
750	..BIRTH TRAUMA	9	7.8	73.0	.	.	.	.	.	.	.	.	.	5.9	1.8
830	HOMICIDE	22	19.1	8.1	.	26.7	25.9	38.9	46.0	.	.	.	.	20.5	1.2
510	PNEUMONIA/INFLNZ	19	16.5	8.1	.	.	5.2	.	34.5	35.0	131.1	328.7	1449.3	23.6	1.4
520	..PNEUMONIA	19	16.5	8.1	.	.	5.2	.	34.5	35.0	131.1	328.7	1449.3	23.6	1.5
540	CHRON PULMON DIS	13	11.3	.	.	.	.	.	.	35.0	229.4	164.3	724.6	18.3	0.7
380	..OTH CHRN PULMO	12	10.4	.	.	.	.	.	.	35.0	196.6	164.3	724.6	16.7	1.0
360	..EMPHYSEMA	1	0.9	.	.	.	.	.	.	.	32.8	.	.	1.6	0.2
730	CONGEN ANOMALIES	10	8.7	73.0	.	.	.	.	.	.	32.8	.	.	7.5	1.2
640	NEPHRITIS, ET AL	5	4.3	.	.	.	.	15.6	11.5	17.5	32.8	.	.	6.5	1.2

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Portland Male (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
670	..RENAL FAIL,ETC	3	2.6	.	.	.	.	7.8	.	17.5	32.8	.	.	4.1	0.8
660	..CHRN GLMR/NEPH	2	1.7	.	.	.	.	7.8	11.5	.	.	.	.	2.5	4.1
090	SEPTICEMIA	4	3.5	8.1	.	.	.	.	11.5	35.0	.	.	.	4.9	1.4
250	BENIGN NEO,OTHER	3	2.6	.	.	.	.	.	.	35.0	.	.	362.3	3.7	1.8
290	MENINGITIS	3	2.6	8.1	.	.	.	7.8	11.5	.	.	.	.	3.1	4.5
590	ULCER-STOM,DUOD	3	2.6	.	3.9	.	.	.	.	.	.	.	724.6	2.4	1.0
630	CHOLEL/GALLBLDR	3	2.6	.	.	.	.	7.8	.	.	32.8	82.2	.	4.0	5.0
270	NUTRITION DEFICS	2	1.7	.	.	.	.	.	.	.	32.8	.	362.3	2.4	4.9
480	ATHEROSCLEROSIS	2	1.7	.	.	.	.	.	.	.	.	82.2	362.3	2.2	0.4
490	OTHER ARTERY DIS	2	1.7	.	.	.	.	.	.	.	32.8	82.2	.	2.9	0.3
020	OTH INTSTNL INFS	1	0.9	8.1	.	.	.	.	.	.	.	.	.	0.7	6.6
030	TUBERCULOSIS	1	0.9	.	.	.	.	.	.	17.5	.	.	.	1.4	1.4
040	..TB-RESPIRATORY	1	0.9	.	.	.	.	.	.	17.5	.	.	.	1.4	1.8
140	ALL OTH INF/PARA	1	0.9	.	.	.	.	.	.	.	.	82.2	.	1.3	0.8
420	..HYPRTNS+/- RNL	1	0.9	.	.	.	.	7.8	.	.	.	.	.	1.1	0.5
610	HERNIA/INTST.OBS	1	0.9	.	.	.	.	.	.	.	32.8	.	.	1.6	1.2
680	KIDNEY INFECTION	1	0.9	.	.	.	.	.	.	.	.	82.2	.	1.3	2.7
690	PROSTATE HYPERPL	1	0.9	.	.	.	.	.	.	17.5	.	.	.	1.4	3.6
770	SYMP/SIGN/ILL-DF	31	26.9	210.9	.	.	.	7.8	11.5	17.5	32.8	82.2	.	23.9	1.8
840	ALL OTH EXTERNL C	7	6.1	.	.	3.8	.	15.6	46.0	.	.	.	.	8.4	3.8
780	ALL OTHER DISEAS	85	73.7	40.6	.	22.9	46.7	101.2	91.9	330.1	262.1	1068.2	1087.0	101.3	2.4

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

TUCSON BOTH SEXES

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	376	755.0	562.9	81.6	243.8	380.5	646.3	1392.2	2613.8	4414.9	8231.7	9426.2	1011.1	1.8
790	ACCIDENTS/ADVERS	61	122.5	78.2	57.1	69.6	169.1	150.8	177.7	405.6	70.1	304.9	1639.3	143.8	3.6
800	..MOTOR VEHICLE	45	90.4	31.3	57.1	52.2	169.1	129.3	148.1	180.3	70.1	152.4	409.8	106.2	4.9
810	..ALL OTH ACCDNT	16	32.1	46.9	.	17.4	.	21.5	29.6	225.3	.	152.4	1229.5	37.5	2.1
310	DISEASE OF HEART	57	114.5	15.6	8.2	.	.	43.1	177.7	270.4	1681.9	1981.7	1639.3	171.6	0.9
410	..ALL OTH HRT DS	29	58.2	15.6	8.2	.	.	21.5	59.2	135.2	840.9	1067.1	819.7	84.9	2.1
350	..ISCHMC HRT DIS	24	48.2	.	.	.	.	21.5	88.9	135.2	700.8	762.2	819.7	73.7	0.5
390	....OLD MI,OTHER	13	26.1	.	.	.	.	21.5	29.6	.	420.5	457.3	819.7	37.0	0.6
360	....ACUT MYO INF	11	22.1	.	.	.	.	.	59.2	135.2	280.3	304.9	.	36.7	0.4
330	..HYPRTNS HRT DS	2	4.0	.	.	.	.	.	29.6	.	.	152.4	.	6.1	1.1
320	..RHEUM FEVER	1	2.0	.	.	.	.	.	.	.	70.1	.	.	3.4	1.5
400	..OTH ENDOCRD DS	1	2.0	.	.	.	.	.	.	.	70.1	.	.	3.4	1.7
620	LIVER DIS/CIRRHS	26	52.2	.	.	8.7	56.4	107.7	296.2	225.3	.	152.4	.	81.3	7.1
150	MALIG NEOPLASMS	22	44.2	.	.	8.7	.	.	148.1	315.5	490.5	152.4	409.8	71.9	0.5
170	..MAL NEO-DIGEST	9	18.1	.	.	.	.	.	88.9	135.2	140.2	.	409.8	29.2	0.9
220	..MAL NEO-OTHER	4	8.0	.	.	.	.	.	.	45.1	140.2	152.4	.	13.0	0.8
200	..MAL NEO-GENITL	3	6.0	.	.	.	.	.	.	90.1	70.1	.	.	10.6	0.8
210	..MAL NEO-URINAR	3	6.0	.	.	.	.	.	59.2	45.1	.	.	.	10.6	2.1
180	..MAL NEO-RESPIR	1	2.0	.	.	.	.	.	.	.	70.1	.	.	3.4	0.1
230	..LEUKEMIA	1	2.0	.	.	8.7	.	.	.	.	.	.	.	1.6	0.3
240	..OTH NEOP LYMPH	1	2.0	.	.	.	.	.	.	.	70.1	.	.	3.4	0.5
820	SUICIDE	19	38.2	.	.	87.1	56.4	21.5	59.2	90.1	.	.	.	42.2	3.7
260	DIABETES MELLITU	18	36.1	.	.	.	14.1	.	29.6	180.3	210.2	1372.0	.	54.2	3.5
510	PNEUMONIA/INFLNZ	14	28.1	31.3	8.2	.	.	43.1	29.6	.	140.2	609.8	819.7	33.0	2.7
520	..PNEUMONIA	14	28.1	31.3	8.2	.	.	43.1	29.6	.	140.2	609.8	819.7	33.0	2.8
090	SEPTICEMIA	10	20.1	15.6	.	.	.	.	29.6	45.1	210.2	457.3	409.8	27.6	9.5
830	HOMICIDE	10	20.1	.	.	43.5	.	64.6	29.6	.	70.1	.	.	23.8	2.3
430	CEREBROVASC DS	9	18.1	.	.	.	.	.	.	135.2	140.2	457.3	409.8	26.7	0.7
470	..ALL OTH CBV DS	4	8.0	.	.	.	.	.	.	.	140.2	152.4	409.8	10.6	0.4
440	..INTRCRB HMRHG	3	6.0	.	.	.	.	.	.	135.2	.	.	.	10.9	1.8
450	..CEREBRL THROMB	2	4.0	.	.	.	.	.	.	.	.	304.9	.	5.3	0.8
420	..HYPRTNS+/- REL	7	14.1	.	.	.	.	21.5	59.2	90.1	70.1	.	409.8	21.7	11.4
640	NEPHRITIS, ET AL	7	14.1	.	.	.	.	.	59.2	90.1	140.2	152.4	.	23.6	5.3
670	..RENAL FAIL,ETC	6	12.0	.	.	.	.	.	59.2	90.1	140.2	.	.	21.0	5.5
660	..CHRN GLMR/NEPH	1	2.0	.	.	.	.	.	.	.	.	152.4	.	2.6	5.3
030	TUBERCULOSIS	5	10.0	.	.	.	.	21.5	29.6	.	140.2	152.4	.	15.9	26.5
730	CONGEN ANOMALIES	5	10.0	78.2	.	.	.	.	.	.	.	.	.	6.3	1.1
040	..TB-RESPIRATORY	4	8.0	.	.	.	.	.	29.6	.	140.2	152.4	.	12.9	25.8
050	..OTHER TB	1	2.0	.	.	.	.	21.5	.	.	.	.	.	3.0	30.0

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Tucson Both Sexes (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
140	ALL OTH INF/PARA	4	8.0	.	.	.	.	.	29.6	135.2	.	.	.	14.3	9.6
740	PERINATAL CONDIT	4	8.0	62.5	.	.	.	.	.	.	.	.	.	5.0	0.5
750	..BIRTH TRAUMA	2	4.0	31.3	.	.	.	.	.	.	.	.	.	2.5	0.9
760	..OTH COND PERIN	2	4.0	31.3	.	.	.	.	.	.	.	.	.	2.5	0.4
540	CHRON PULMON DIS	3	6.0	.	.	.	.	.	.	.	.	457.3	.	7.9	0.5
580	..OTH CHRN PULMO	3	6.0	.	.	.	.	.	.	.	.	457.3	.	7.9	0.8
490	OTHER ARTERY DIS	2	4.0	.	.	.	.	.	.	.	70.1	.	409.8	4.5	0.9
010	SHIGELL/AMEBIASI	1	2.0	.	.	.	.	.	.	45.1	.	.	.	3.6	.
280	ANEMIAS	1	2.0	.	.	.	.	.	.	.	70.1	.	.	3.4	3.8
290	MENINGITIS	1	2.0	15.6	.	.	.	.	.	.	.	.	.	1.3	2.5
590	ULCER-STOM,DUOD	1	2.0	.	.	.	.	.	29.6	.	.	.	.	3.5	2.1
610	HERNIA/INTST.OBS	1	2.0	.	.	.	.	.	.	45.1	.	.	.	3.6	2.8
680	KIDNEY INFECTION	1	2.0	.	.	.	.	.	.	.	.	152.4	.	2.6	5.3
690	PROSTATE HYPERPL	1	2.0	.	.	.	.	.	.	.	.	.	409.8	1.1	11.4
770	SYMP/SIGN/ILL-DF	34	68.3	172.0	.	.	14.1	21.5	59.2	90.1	490.5	914.6	1639.3	77.4	7.9
840	ALL OTH EXTRNL C	3	6.0	.	.	8.7	14.1	.	.	45.1	.	.	.	7.5	5.0
780	ALL OTHER DISEAS	49	98.4	93.8	8.2	17.4	56.4	150.8	148.1	405.6	420.5	914.6	1229.5	131.8	3.8

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

TUCSON FEMALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
ALL	ALL CAUSES	151	591.1	534.1	65.6	136.3	299.7	243.0	969.3	1752.9	4672.9	6441.7	7518.8	781.2	1.9
310	DISEASE OF HEART	29	113.5	31.4	.	.	.	40.5	161.6	166.9	2002.7	1840.5	751.9	173.6	1.3
410	..ALL OTH HRT DS	15	58.7	31.4	.	.	.	40.5	53.9	83.5	934.6	1227.0	.	88.8	2.9
350	..ISCHMC HRT DIS	12	47.8	.	.	.	.	.	53.9	83.5	934.6	613.5	751.9	72.1	0.8
390	....OLD MI,OTHER	7	27.4	.	.	.	.	.	.	.	534.0	613.5	751.9	39.7	0.9
360	....ACUT MYO INF	5	19.8	.	.	.	.	.	53.9	83.5	400.5	.	.	32.4	0.6
320	..RHEUM FEVER	1	3.9	.	.	.	.	.	.	.	133.5	.	.	6.5	2.4
330	..HYPRTNS HRT DS	1	3.9	.	.	.	.	.	53.9	.	.	.	.	6.2	1.2
790	ACCIDENTS/ADVERS	19	74.4	94.3	65.6	51.1	81.7	.	215.4	.	.	306.7	751.9	74.2	3.6
800	..MOTOR VEHICLE	14	54.8	31.4	65.6	51.1	81.7	.	161.6	.	.	.	.	55.0	4.9
810	..ALL OTH ACCDNT	5	19.6	62.8	.	.	.	.	53.9	.	.	306.7	751.9	19.2	2.1
260	DIABETES MELLITU	9	35.3	.	.	.	.	.	.	166.9	267.0	1533.7	.	53.9	5.6
090	SEPTICEMIA	8	31.3	.	.	.	.	.	53.9	83.5	400.5	613.5	751.9	45.9	19.1
620	LIVER DIS/CIRRHS	8	31.3	.	.	17.0	81.7	.	161.6	.	.	306.7	.	40.7	5.5
150	MALIG NEOPLASMS	7	27.4	.	.	17.0	.	.	.	333.9	267.0	.	.	42.5	0.4
170	..MAL NEO-DIGEST	2	7.8	.	.	.	.	.	.	83.5	133.5	.	.	13.1	0.5
220	..MAL NEO-OTHER	2	7.8	.	.	.	.	.	.	83.5	133.5	.	.	13.1	0.9
200	..MAL NEO-GENITL	1	3.9	.	.	.	.	.	.	83.5	.	.	.	6.6	0.5
210	..MAL NEO-URINAR	1	3.9	.	.	.	.	.	.	83.5	.	.	.	6.6	2.2
230	..LEUKEMIA	1	3.9	.	.	17.0	.	.	.	.	.	.	.	3.1	0.8
430	CEREBROVASC DS	6	23.5	.	.	.	.	.	.	250.4	267.0	306.7	.	38.3	1.1
440	..INTRCRB HMRHG	3	11.7	.	.	.	.	.	.	250.4	.	.	.	19.7	3.6
470	..ALL OTH CBV DS	2	7.8	.	.	.	.	.	.	.	267.0	.	.	13.1	0.6
450	..CEREBRL THROMB	1	3.9	.	.	.	.	.	.	.	.	306.7	.	5.5	0.9
510	PNEUMONIA/INFLNZ	5	19.6	31.4	.	.	.	.	53.9	.	133.5	.	1503.8	20.2	2.2
520	..PNEUMONIA	5	19.6	31.4	.	.	.	.	53.9	.	133.5	.	1503.8	20.2	2.3
420	..HYPRTNS+/- RNL	4	15.7	.	.	.	.	40.5	53.9	.	133.5	.	751.9	20.9	12.3
820	SUICIDE	4	15.7	.	.	34.1	54.5	.	.	.	.	.	.	15.2	2.7
140	ALL OTH INF/PARA	3	11.7	.	.	.	.	.	53.9	166.9	.	.	.	19.3	14.9
640	NEPHRITIS, ET AL	3	11.7	.	.	.	.	.	53.9	83.5	133.5	.	.	19.3	5.4
670	..RENAL FAIL,ETC	3	11.7	.	.	.	.	.	53.9	83.5	133.5	.	.	19.3	6.2
730	CONGEN ANOMALIES	3	11.7	94.3	.	.	.	.	.	.	.	.	.	7.5	1.4
740	PERINATAL CONDIT	2	7.8	62.8	.	.	.	.	.	.	.	.	.	5.0	0.6
760	..OTH COND PERIN	2	7.8	62.8	.	.	.	.	.	.	.	.	.	5.0	0.9
010	SHIGELL/AMEBIASI	1	3.9	.	.	.	.	.	.	83.5	.	.	.	6.6	.
030	TUBERCULOSIS	1	3.9	.	.	.	.	.	.	.	133.5	.	.	6.5	16.3
040	..TB-RESPIRATORY	1	3.9	.	.	.	.	.	.	.	133.5	.	.	6.5	21.8
490	OTHER ARTERY DIS	1	3.9	.	.	.	.	.	.	.	.	.	751.9	2.5	0.8
540	CHRON PULMON DIS	1	3.9	.	.	.	.	.	.	.	.	306.7	.	5.5	0.6

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Tucson Female (cont'd)

CODE	CAUSE	TOTAL DEATHS	ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION) 0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
580	[illegible]OTH CHRN PULMO	1	3.9	.	.	.	.	.	.	.	.	306.7	.	5.5	0.9
610	HERNIA/INTST.OBS	1	3.9	.	.	.	.	.	.	83.5	.	.	.	6.6	5.1
680	KIDNEY INFECTION	1	3.9	.	.	.	.	.	.	.	.	306.7	.	5.5	9.2
830	HOMICIDE	1	3.9	.	.	.	.	40.5	.	.	.	.	.	5.7	1.3
770	SYMP/SIGN/ILL-DF	10	39.1	94.3	.	.	.	.	53.9	.	400.5	.	2255.6	40.7	5.7
840	ALL OTH EXTRNL C	2	7.8	.	.	17.0	27.2	.	.	.	.	.	.	7.6	8.5
780	ALL OTHER DISEAS	22	86.1	125.7	.	.	54.5	121.5	107.7	333.9	534.0	920.2	.	117.3	4.1

DEATHS, AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES AND RATIO TO U.S. ALL RACES AGE-ADJUSTED DEATH RATES,
72 SELECTED CAUSES
11 IHS AREAS, 1980-82
BY LEADING CAUSES, BY BOTH SEXES AND MALE/FEMALE

TUCSON MALE

IHS CODE[a]	CAUSE[b]	TOTAL DEATHS	CRUDE RATE ALL AGES	AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)										AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
				0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER		
ALL	ALL CAUSES	225	927.7	591.5	97.3	356.0	467.2	1104.5	1909.2	3623.9	4129.8	10000.0	11711.7	1272.8	1.7
790	ACCIDENTS/ADVERS	42	173.2	62.3	48.6	89.0	262.8	322.1	131.7	881.5	147.5	303.0	2702.7	222.5	3.7
800	..MOTOR VEHICLE	31	127.8	31.1	48.6	53.4	262.8	276.1	131.7	391.8	147.5	303.0	900.9	162.8	5.0
810	..ALL OTH ACCDNT	11	45.4	31.1	.	35.6	.	46.0	.	489.7	.	.	1801.8	59.7	2.2
310	DISEASE OF HEART	28	115.4	.	16.2	.	.	46.0	197.5	391.8	1327.4	2121.2	2702.7	169.9	0.6
410	..ALL OTH HRT DS	14	57.7	.	16.2	.	.	.	65.8	195.9	737.5	909.1	1801.8	81.3	1.5
350	..ISCHMC HRT DIS	12	49.5	.	.	.	.	46.0	131.7	195.9	442.5	909.1	900.9	76.5	0.4
360	....ACUT MYO INF	6	24.7	.	.	.	.	.	65.8	195.9	147.5	606.1	.	41.0	0.3
390	....OLD MI,OTHER	6	24.7	.	.	.	.	46.0	65.8	.	295.0	303.0	900.9	35.6	0.4
330	..HYPRTNS HRT DS	1	4.1	.	.	.	.	.	.	.	.	303.0	.	5.0	0.8
400	..OTH ENDOCRD DS	1	4.1	.	.	.	.	.	.	.	147.5	.	.	7.1	2.8
620	LIVER DIS/CIRRHS	18	74.2	.	.	.	29.2	230.1	460.8	489.7	.	.	.	132.2	8.3
150	MALIG NEOPLASMS	15	61.8	.	.	.	.	.	329.2	293.8	737.5	303.0	900.9	106.2	0.6
820	SUICIDE	15	61.8	.	.	142.4	58.4	46.0	131.7	195.9	.	.	.	73.2	4.1
170	..MAL NEO-DIGEST	7	28.9	.	.	.	.	.	197.5	195.9	147.5	.	900.9	49.1	1.2
200	..MAL NEO-GENITL	2	8.2	.	.	.	.	.	.	97.9	147.5	.	.	15.1	1.0
210	..MAL NEO-URINAR	2	8.2	.	.	.	.	.	131.7	.	.	.	.	15.9	2.0
220	..MAL NEO-OTHER	2	8.2	.	.	.	.	.	.	.	147.5	303.0	.	12.0	0.6
180	..MAL NEO-RESPIR	1	4.1	.	.	.	.	.	.	.	147.5	.	.	7.1	0.1
240	..OTH NEOP LYMPH	1	4.1	.	.	.	.	.	.	.	147.5	.	.	7.1	0.9
260	DIABETES MELLITU	9	37.1	.	.	.	29.2	.	65.8	195.9	147.5	1212.1	.	55.5	5.6
510	PNEUMONIA/INFLNZ	9	37.1	31.1	16.2	.	.	92.0	.	.	147.5	1212.1	.	45.0	2.7
520	..PNEUMONIA	9	37.1	31.1	16.2	.	.	92.0	.	.	147.5	1212.1	.	45.0	2.8
830	HOMICIDE	9	37.1	.	.	89.0	.	92.0	65.8	.	147.5	.	.	43.8	2.6
030	TUBERCULOSIS	4	16.5	.	.	.	.	46.0	65.8	.	147.5	303.0	.	26.3	26.3
640	NEPHRITIS, ET AL	4	16.5	.	.	.	.	.	65.8	97.9	147.5	303.0	.	28.0	5.0
040	..TB-RESPIRATORY	3	12.4	.	.	.	.	.	65.8	.	147.5	303.0	.	20.0	25.0
670	..RENAL FAIL,ETC	3	12.4	.	.	.	.	.	65.8	97.9	147.5	.	.	23.0	4.7
050	..OTHER TB	1	4.1	.	.	.	.	46.0	.	.	.	.	.	6.4	63.8
660	..CHRN GLMR/NEPH	1	4.1	.	.	.	.	.	.	.	.	303.0	.	5.0	8.3
420	..HYPRTNS+/- RNL	3	12.4	.	.	.	.	.	65.8	195.9	.	.	.	24.0	10.9
430	CEREBROVASC DS	3	12.4	.	.	.	.	.	.	.	.	606.1	900.9	12.1	0.3
470	..ALL OTH CBV DS	2	8.2	.	.	.	.	.	.	.	.	303.0	900.9	7.1	0.3
450	..CERBRL THROMB	1	4.1	.	.	.	.	.	.	.	.	303.0	.	5.0	0.7
090	SEPTICEMIA	2	8.2	31.1	.	.	.	.	.	.	.	303.0	.	7.5	2.2
540	CHRON PULMON DIS	2	8.2	.	.	.	.	.	.	.	.	606.1	.	9.9	0.4
580	..OTH CHRN PULMO	2	8.2	.	.	.	.	.	.	.	.	606.1	.	9.9	0.6
730	CONGEN ANOMALIES	2	8.2	62.3	.	.	.	.	.	.	.	.	.	5.0	0.8
740	PERINATAL CONDIT	2	8.2	62.3	.	.	.	.	.	.	.	.	.	5.0	0.5

[a] Equivalence to ICD-9 codes available from IHS.
[b] Cause ranked in order by number of deaths for leading causes.

Deaths, Age-Specific and Age-adjusted Death Rates, Tucson Male (cont'd)

				AGE-SPECIFIC DEATH RATES (PER 100,000 POPULATION)											
CODE	CAUSE	TOTAL DEATHS	ALL AGES	0-4 YEARS	5-14 YEARS	15-24 YEARS	25-34 YEARS	35-44 YEARS	45-54 YEARS	55-64 YEARS	65-74 YEARS	75-84 YEARS	85 YEARS AND OVER	AGE-ADJUST RATE	RATIO TO U.S. ALL-RACES AGE-ADJUSTED RATES
750	..BIRTH TRAUMA	2	8.2	62.3	.	.	.	.	.	.	.	.	.	5.0	1.5
140	ALL OTH INF/PARA	1	4.1	.	.	.	.	.	.	97.9	.	.	.	8.0	4.7
280	ANEMIAS	1	4.1	.	.	.	.	.	.	.	147.5	.	.	7.1	7.1
290	MENINGITIS	1	4.1	31.1	.	.	.	.	.	.	.	.	.	2.5	3.6
490	OTHER ARTERY DIS	1	4.1	.	.	.	.	.	.	.	147.5	.	.	7.1	0.8
590	ULCER-STOM,DUOD	1	4.1	.	.	.	.	.	65.8	.	.	.	.	7.9	3.4
690	PROSTATE HYPERPL	1	4.1	.	.	.	.	.	.	.	.	.	900.9	2.2	5.4
780	ALL OTHER DISEAS	27	111.3	62.3	16.2	35.6	58.4	184.1	197.5	489.7	295.0	909.1	2702.7	148.5	3.5
840	ALL OTH EXTRNL C	1	4.1	.	.	.	.	.	.	97.9	.	.	.	8.0	3.6
770	SYMP/SIGN/ILL-DF	24	99.0	249.1	.	.	29.2	46.0	65.8	195.9	590.0	1818.2	900.9	115.4	8.9

Appendix C

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Years 1972-85

IHS Allocations by Area and Budget Category, with Service Population Data, Fiscal Year 1985[a]

Area	Service Population	Clinical Services	Contract Care[b]	Preventive Health	Other	TOTAL FY 85
Aberdeen	72,679	$61,025,600	$22,008,000	$7,151,600	$6,092,900	$74,270,100
Alaska	73,351	101,786,500	19,677,000	10,352,100	7,654,000	119,792,600
Albuquerque	52,471	44,003,900	11,246,000	4,110,000	5,251,400	53,365,300
Bemidji	48,245	32,103,900	9,304,000	3,578,500	3,649,700	39,332,100
Billings	41,326	42,449,200	18,990,100	4,386,300	4,659,500	51,495,000
California	73,414	24,760,500	534,000	1,923,900	4,558,900	31,243,300
Headquarters East	0	22,887,200	0	107,500	14,929,700	37,924,400
Headquarters West	0	2,561,100	0	528,000	3,475,300	6,564,400
Nashville (USET)	36,413	27,823,000	6,933,000	2,168,100	2,430,500	32,421,600
Navajo	166,493	92,392,800	19,242,000	9,902,900	4,538,900	106,834,600
Oklahoma	195,346	83,591,100	17,349,900	8,032,100	6,917,200	98,540,400
Phoenix	84,516	73,859,000	14,618,000	7,402,700	7,107,900	88,369,600
Portland	98,996	39,305,400	19,547,000	4,321,300	5,571,800	49,198,500
Tucson	18,332	13,559,700	4,507,000	1,757,000	2,479,300	17,796,000
Total FY 1985:	961,582	$662,108,900	$163,956,000	$65,722,000	$79,317,000	$807,147,900

[a] Fiscal year 1985 allocations include 1985 supplemental pay act appropriations; figures final as of 9/26/85.

[b] Contract care allocations are included in the clinical services allocations for fiscal years 1981-85.

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1984

Area	Service Population	Clinical Services	Contract Care[b]	Preventive Health	Other	TOTAL FY 84	Discharges	Outpatient Visits
Aberdeen	70,648	$59,951,000	$20,029,000	$7,104,100	$6,063,900	$73,119,000	10,731	411,764
Alaska	71,329	104,469,400	19,296,000	7,719,400	7,755,700	119,944,500	9,895	262,380
Albuquerque	51,211	43,349,000	10,694,000	4,098,400	5,325,600	52,773,000	5,632	271,654
Bemidji	47,000	31,082,400	8,980,000	3,455,600	3,506,200	38,044,200	1,589	109,386
Billings	40,106	42,590,000	18,976,000	4,404,600	4,676,700	51,671,300	3,459	276,767
California	71,642	21,390,500	525,000	1,861,500	4,247,400	27,499,400	--	--
Headquarters East	0	21,228,700	0	111,700	14,742,000	36,082,400	--	--
Headquarters West	0	2,906,800	0	502,000	3,510,500	6,919,300	--	--
Nashville (USET)	35,822	26,209,600	6,712,000	2,074,000	3,088,100	31,371,700	1,319	60,901
Navajo	162,005	90,383,900	19,074,000	9,155,100	4,569,100	104,108,100	18,647	628,085
Oklahoma	190,451	80,237,400	16,478,000	7,919,600	6,685,700	94,842,700	11,606	566,373
Phoenix	82,309	70,816,800	14,284,000	7,098,100	6,524,100	84,439,000	13,419	389,799
Portland	96,427	38,140,700	18,549,000	4,299,300	5,380,900	47,820,900	--	212,547
Tucson	17,852	12,756,000	4,330,000	1,792,600	2,416,200	16,964,800	1,278	59,004
Total FY 1984:	936,802	$645,512,200	$157,927,000	$61,596,000	$78,492,100	$785,600,300	77,575	3,248,660

[b] Contract care allocations are included in the clinical services allocations for fiscal years 1981-85.

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1983

Area	Service Population	Clinical Services	Contract Care[b]	Preventive Health	Other	TOTAL FY 83	Discharges	Outpatient Visits
Aberdeen	68,688	$53,863,200	$17,171,000	$6,122,600	$5,469,600	$65,455,400	10,969	411,928
Alaska	69,383	93,129,300	17,644,000	6,310,400	7,459,000	106,898,700	9,550	259,227
Albuquerque	49,997	39,961,700	9,406,000	3,836,800	4,756,000	48,554,500	5,190	273,681
Bemidji	45,821	27,389,600	7,927,000	3,127,200	2,836,200	33,353,000	1,732	106,135
Billings	38,935	38,049,600	16,686,000	3,999,900	4,142,400	46,191,900	3,564	268,768
California	69,989	19,074,000	475,000	1,434,300	3,187,400	23,695,700	--	--
Headquarters Eact	0	16,957,500	50,000	222,500	13,344,900	30,524,900	--	--
Headquarters West	0	2,429,200	0	460,000	2,537,600	5,426,800	--	--
Nashville (USET)	30,664	22,957,000	6,054,000	1,732,100	2,151,400	26,840,500	2,201	83,857
Navajo	157,627	76,543,200	16,185,000	7,597,200	4,180,700	88,321,100	18,667	586,752
Oklahoma	185,811	67,286,400	13,971,000	6,920,000	5,594,500	79,800,900	12,170	593,131
Phoenix	80,203	64,390,300	12,862,000	6,713,700	5,967,000	77,071,000	12,881	402,717
Portland	87,881	34,402,200	17,039,000	3,530,900	4,456,100	42,389,200	--	206,028
Tucson	17,400	12,656,600	4,352,000	1,538,500	2,253,200	16,448,300	1,200	60,477
Total FY 1983:	902,399	$569,089,800	$139,822,000	$53,546,100	$68,336,000	$690,971,900	78,124	3,252,701

[b] Contract care allocations are included in the clinical services allocations for fiscal years 1981-85.

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1982

Area	Service Population	Clinical Services	Contract Care[b]	Preventive Health	Other	TOTAL FY 82	Discharges	Outpatient Visits
Aberdeen	66,805	$47,020,800	$13,781,000	$6,103,800	$6,224,300	$59,348,900	10,642	386,227
Alaska	67,521	83,595,500	12,325,000	5,950,200	6,811,300	96,357,000	8,973	265,720
Albuquerque	48,825	33,266,400	8,229,000	4,079,000	4,471,600	41,817,000	4,877	276,761
Bemidji	44,711	24,502,900	3,967,000	2,978,400	2,847,600	30,328,900	1,962	103,584
Billings	37,813	33,818,300	14,973,000	4,009,100	4,134,200	41,961,600	3,899	261,723
California	68,460	16,099,800	377,000	1,327,800	2,898,900	20,326,500	--	--
Headquarters East	0	16,789,000	0	218,000	13,154,100	30,161,100	--	--
Headquarters West	0	2,499,800	0	480,000	3,007,600	5,987,400	--	--
Nashville (USET)	28,136	17,986,700	2,854,000	2,072,000	1,882,000	21,940,700	2,035	75,833
Navajo	153,360	65,413,400	11,255,000	8,375,100	4,108,100	77,896,600	18,328	644,806
Oklahoma	180,664	59,542,100	10,721,000	7,940,500	5,831,400	73,314,000	12,785	646,136
Phoenix	78,206	61,478,400	12,572,000	6,553,400	5,599,300	73,631,100	12,403	419,450
Portland	79,086	31,028,800	15,177,000	3,356,100	5,194,100	39,579,000	--	194,686
Tucson	16,980	10,983,000	4,196,000	1,619,600	2,370,700	14,973,300	1,248	59,439
Regions	0	21,400	0	0	0	21,400	--	--
Total FY 1982:	870,567	$504,046,300	$110,427,000	$55,063,000	$68,535,200	$627,644,500	77,152	3,334,365

[b] Contract care allocations are included in the clinical services allocations for fiscal years 1981-85.

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1981

Area	Service Population	Clinical Services	Contract Care[b]	Preventive Health	Other	TOTAL FY 81	Discharges	Outpatient Visits
Aberdeen	64,990	$44,491,400	$12,953,700	$6,994,900	$5,009,700	$56,496,000	11,636	383,486
Alaska	65,743	83,796,100	11,267,000	6,568,600	6,842,200	97,206,900	10,274	203,359
Albuquerque	47,695	32,892,000	8,474,300	4,661,700	4,722,600	42,276,300	5,135	262,596
Bemidji	43,664	23,157,800	3,941,000	3,315,400	2,869,800	29,343,000	1,811	98,724
Billings	36,735	32,446,500	14,461,000	4,489,200	4,016,400	40,952,100	3,722	270,781
California	67,048	14,616,700	241,000	1,484,600	3,909,600	20,010,900	--	--
Headquarters East	0	17,476,500	3,000,000	161,000	12,928,200	30,565,700	--	--
Headquarters West	0	2,979,000	0	467,100	2,632,500	6,078,600	--	--
Nashville (USET)	27,181	18,797,100	3,205,000	2,459,800	2,190,200	23,447,100	2,160	89,026
Navajo	149,208	61,322,800	10,779,700	9,402,300	4,159,600	74,884,700	18,311	632,505
Oklahoma	176,527	55,175,700	9,164,000	8,684,900	6,081,300	69,941,900	13,414	620,097
Phoenix	76,309	55,769,800	12,228,200	7,148,400	6,503,800	69,422,000	14,033	425,113
Portland	77,385	27,673,400	14,255,000	3,772,800	5,131,300	36,577,500	--	188,411
Tucson	16,590	10,293,200	3,682,100	2,046,800	3,701,400	16,041,400	1,149	52,964
Total FY 1981:	849,075	$480,888,000	$107,652,000	$61,657,500	$70,698,600	$613,244,100	81,645	3,227,06

[b] Contract care allocations are included in the clinical services allocations for fiscal years 1981-85.

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1980

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Prev. Hlth/ Amb. Care	Other	TOTAL FY 80	Discharges	Outpatient Visits
Aberdeen	63,253	$13,210,600	$11,993,800	$23,221,300	$4,095,900	$52,521,600	11,614	374,668
Alaska	64,047	32,580,000	12,890,500	35,955,700	6,186,600	87,612,800	10,646	271,914
Albuquerque	46,610	10,662,500	7,934,000	16,974,700	3,764,500	39,335,700	4,344	249,671
Bemidji	42,686	2,298,700	4,892,000	15,231,500	1,715,000	24,137,200	1,555	92,828
Billings	35,708	5,137,200	14,031,400	16,034,200	3,112,400	38,315,200	3,843	249,022
California	65,757	4,534,000	925,000	6,478,200	668,800	12,606,000	--	--
Headquarters East	0	13,164,700	2,700,000	2,405,700	10,512,800	28,783,200	--	--
Headquarters West	0	1,048,200	0	2,525,000	2,035,900	5,609,100	--	--
Nashville (USET)	26,731	3,168,900	6,221,200	7,692,500	1,583,000	18,665,600	2,112	87,472
Navajo	145,162	26,616,400	12,642,700	30,373,800	2,671,500	72,304,400	18,270	651,290
Oklahoma	172,636	16,193,300	7,433,000	31,970,700	4,275,700	59,872,700	11,060	569,476
Phoenix	74,020	20,341,700	11,976,200	27,169,100	4,469,100	63,956,100	13,348	416,049
Portland	75,769	1,020,000	13,478,000	15,803,700	2,461,500	32,763,200	--	176,150
Tucson	16,230	5,231,000	2,088,000	6,046,000	1,169,100	14,534,100	1,063	56,396
Total FY 1980:	828,609	$155,207,200	$109,205,800	$237,882,100	$48,721,800	$551,016,900	77,855	3,194,936

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1979

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Prev. Hlth./ Amb. Care	Other	TOTAL FY 79	Discharges	Outpatient Visits
Aberdeen	61,607	$12,221,300	$10,627,000	$23,309,300	$1,685,300	$47,842,900	10,958	371,766
Alaska	62,223	30,020,000	11,303,500	34,605,900	2,477,400	78,406,800	9,921	245,227
Albuquerque	45,360	9,476,400	7,253,400	16,249,800	1,735,900	34,715,500	4,049	229,545
Bemidji	39,963	2,367,500	4,269,000	15,231,600	0	21,868,100	1,483	82,836
Billings	34,932	5,327,400	11,826,200	16,255,400	1,463,500	34,872,500	3,929	230,713
California	61,324	4,292,800	691,000	5,596,800	0	10,580,600	--	--
Headquarters East	0	18,293,800	2,400,000	1,676,100	4,199,000	26,568,900	--	--
Headquarters West	0	1,385,800	75,000	1,861,900	1,605,300	4,928,000	--	--
Nashville (USET)	25,910	2,775,900	5,113,600	8,799,900	0	16,689,400	2,086	85,037
Navajo	138,531	24,542,800	11,347,800	29,841,400	985,300	66,717,300	18,482	686,742
Oklahoma	165,448	13,827,600	6,789,200	30,583,300	1,799,700	52,999,800	10,744	525,356
Phoenix	71,565	18,224,300	10,454,900	26,304,400	1,864,700	56,848,300	12,469	403,014
Portland	68,041	1,207,900	11,117,300	15,682,200	777,700	28,785,100	--	170,832
Tucson	15,582	5,279,200	1,586,100	7,223,600	0	14,088,900	1,137	52,282
Total FY 1979:	790,486	$149,242,700	$94,854,000	$233,221,600	$18,593,800	$495,912,100	75,258	3,083,350

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1978

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Prev. Hlth./ Amb. Care	Other	TOTAL FY 78	Discharges	Outpatient Visits
Aberdeen	57,546	$11,300,900	$9,948,300	$20,371,600	$1,670,000	$43,290,800	12,429	382,003
Alaska	60,964	27,127,000	10,799,900	32,287,700	2,514,100	72,728,700	10,119	305,595
Albuquerque	44,811	9,686,200	6,395,000	15,481,800	3,158,200	34,721,200	3,894	215,999
Bemidji	37,444	1,872,200	3,887,200	10,362,900	0	16,122,300	1,663	83,451
Billings	34,024	4,638,100	11,826,600	13,957,700	1,363,600	31,786,000	3,569	238,389
California[c]	57,803	3,783,800	229,000	4,302,200	0	8,315,000	--	--
Headquarters East	0	16,739,800	1,753,000	1,270,600	4,342,100	24,105,500	--	--
Nashville (USET)	22,729	2,468,300	3,644,800	7,055,500	0	13,168,600	2,279	88,611
Navajo	130,919	20,873,500	11,471,500	26,662,700	920,300	59,928,000	19,032	722,185
Oklahoma	156,587	12,616,300	6,156,700	28,106,300	1,746,800	48,626,100	10,755	472,316
Phoenix	68,649	14,252,900	11,314,000	22,908,100	1,819,400	50,294,400	12,782	403,982
Portland	40,140	879,600	9,974,000	13,307,400	752,600	24,913,600	--	159,804
Tucson	14,935	4,261,000	1,442,000	6,752,500	0	12,455,500	1,090	52,381
Total FY 1978:	726,551	$130,499,600	$88,842,000	$202,827,000	$18,287,100	$440,455,700	77,612	3,124,716

[c] California officially added as an IHS service area.

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1977

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Prev. Hlth./ Amb. Care	Other	TOTAL FY 77	Discharges	Outpatient Visits
Aberdeen	55,968	$10,192,300	$7,541,700	$16,483,200	$1,521,300	$35,738,500	13,161	383,300
Alaska	59,710	23,193,800	7,127,100	26,907,500	2,346,000	59,574,400	10,234	285,340
Albuquerque	43,350	6,294,800	5,117,300	11,044,700	2,668,300	25,125,100	3,442	205,426
Bemidji	35,780	1,600,400	3,258,000	7,253,700	0	12,112,100	1,631	78,244
Billings	33,262	3,762,600	7,850,100	11,593,400	1,271,800	24,477,900	3,504	238,229
California[d]	0	11,000	0	0	0	11,000	--	--
Headquarters East	0	12,531,500	1,190,000	1,977,700	4,046,000	19,745,200	--	--
Nashville (USET)	13,037	2,250,200	1,826,300	5,882,800	0	9,959,300	2,052	86,187
Navajo	126,000	18,670,800	8,100,300	22,189,600	1,007,100	49,967,800	19,297	648,682
Oklahoma	149,444	10,584,500	5,047,300	21,036,700	1,639,800	38,308,300	10,322	432,219
Phoenix[d]	66,108	13,075,500	7,519,000	20,650,000	1,680,500	42,925,000	13,800	404,484
Portland	38,367	821,300	7,933,900	10,374,900	684,200	19,814,300	--	147,326
Tucson	14,287	3,543,000	712,000	5,637,800	0	9,892,800	1,078	51,413
Regions	0	63,900	0	0	0	63,900	--	--
Total FY 1977:	635,313	$106,595,600	$63,223,000	$161,032,000	$16,865,000	$347,715,600	78,521	2,960,850

[d] Phoenix service area allocations include limited funding for the California Field Office.

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1976

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Prev. Hlth/ Amb. Care	Other	TOTAL FY 76	Discharges	Outpatient Visits
Aberdeen	54,385	$9,528,500	$6,224,800	$12,845,000	$1,305,100	$29,903,400	12,850	346,223
Alaska	58,454	20,843,200	6,385,000	19,865,750	2,116,800	49,210,750	9,566	268,409
Albuquerque	41,886	5,248,700	4,527,000	7,967,800	2,198,200	19,941,700	3,235	185,698
Bemidji	34,115	1,427,600	2,903,000	4,481,400	0	8,812,000	1,650	68,369
Billings	32,496	3,178,300	6,713,000	8,646,600	1,148,200	19,686,100	3,111	221,618
Headquarters East	0	10,962,600	1,500,500	1,774,200	3,998,000	18,235,300	--	--
Nashville (USET)	12,672	1,804,500	1,672,000	3,410,100	0	6,886,600	1,928	74,568
Navajo	121,078	17,707,200	6,545,000	18,656,600	804,900	43,713,700	19,242	627,669
Oklahoma	142,290	8,757,000	4,436,000	14,480,800	1,450,900	29,124,700	9,970	406,678
Phoenix	63,695	11,175,100	6,479,700	15,975,000	1,546,000	35,175,800	13,602	368,676
Portland	36,586	630,000	6,886,000	8,090,150	619,900	16,226,050	--	135,695
Tucson	13,639	3,108,200	638,000	4,463,600	0	8,209,800	1,042	47,943
Regions	0	25,600	0	0	0	25,600	--	--
Total FY 1976:	611,296	$94,396,500	$54,910,000	$120,657,000	$15,188,000	$285,151,500	76,196	2,751,546

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1975

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Field Health	Other	TOTAL FY 75	Discharges	Outpatient Visits
Aberdeen	52,814	$11,705,200	$5,269,000	$7,856,700	$1,224,900	$26,055,800	12,900	310,700
Alaska	57,198	23,257,000	5,518,000	10,429,400	2,005,600	41,210,000	9,705	264,402
Albuquerque	40,426	5,974,800	3,755,000	5,608,400	2,039,800	17,378,000	3,469	162,297
Bemidji	32,457	1,523,700	2,529,000	2,480,300	0	6,533,000	1,530	56,656
Billings	31,734	4,419,700	5,542,000	5,905,900	1,087,800	16,955,400	3,028	202,806
Headquarters East	0	9,608,800	415,000	1,470,600	3,617,300	15,111,700	--	--
Nashville (USET)	12,314	2,056,800	1,414,000	1,742,400	0	5,213,200	1,864	70,812
Navajo	116,161	17,879,900	5,095,000	10,564,600	765,700	34,305,200	18,083	513,599
Oklahoma	135,168	10,438,600	4,173,000	8,918,000	1,411,300	24,940,900	9,848	364,933
Phoenix	61,296	15,026,900	5,558,000	8,080,400	1,454,700	30,120,000	13,216	340,407
Portland	34,908	501,100	6,065,000	5,499,600	569,200	12,634,900	--	127,195
Tucson	12,992	3,245,800	580,000	2,972,700	0	6,798,500	924	23,944
Regions	0	40,300	0	0	0	40,300	--	--
Total FY 1975:	587,468	$105,678,600	$45,913,000	$71,529,000	$14,176,300	$237,296,900	74,567	2,437,751

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1974

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Field Health	Other	TOTAL FY 74	Discharges	Outpatient Visits
Aberdeen	50,595	$9,967,991	$4,748,000	$6,797,850	$1,180,900	$22,694,741	11,933	302,442
Alaska	55,700	20,974,900	5,052,000	8,106,600	1,950,000	36,083,500	10,486	246,896
Albuquerque	38,960	4,183,800	3,074,000	4,700,100	1,975,600	13,933,500	3,580	151,331
Bemidji	27,165	1,184,800	2,168,000	1,952,100	0	5,304,900	1,537	54,839
Billings	30,951	3,519,200	4,976,500	4,975,000	1,045,400	14,516,100	2,871	198,150
Headquarters East	0	5,286,000	437,000	1,287,000	3,503,000	10,513,000	--	--
Nashville (USET)	11,947	1,569,000	1,085,000	1,329,900	0	3,983,900	1,620	67,259
Navajo	111,237	16,530,700	4,505,000	9,200,550	719,700	30,955,950	18,124	513,599
Oklahoma	128,000	9,204,600	3,863,900	6,560,800	1,331,400	20,960,700	9,359	328,196
Phoenix	58,875	13,315,500	5,143,000	7,111,600	1,382,000	26,952,100	12,805	341,377
Portland	31,974	306,000	5,107,600	4,674,300	562,000	10,649,900	--	117,603
Tucson	12,343	2,902,300	493,000	2,032,100	0	5,427,400	1,098	39,962
Regions	0	54,200	0	18,300	0	72,500	--	--
Total FY 1974:	557,747	$88,998,991	$40,653,000	$58,746,200	$13,650,000	$202,048,191	73,413	2,361,654

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1973

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Field Health	Other	TOTAL FY 73	Discharges	Outpatient Visits
Aberdeen	49,020	$8,661,700	$3,932,900	$5,722,400	$1,100,800	$19,417,800	13,844	315,533
Alaska	54,440	19,757,700	3,796,900	7,838,500	1,818,900	33,212,000	10,733	223,954
Albuquerque	37,496	3,893,700	2,337,400	3,852,400	1,842,600	11,926,100	3,435	149,059
Bemidji	25,799	1,061,973	1,677,700	1,488,900	0	4,228,573	1,690	56,722
Billings	29,274	2,939,000	4,333,800	4,384,100	974,200	12,631,100	3,247	210,781
Headquarters East	0	5,390,700	413,000	1,577,700	3,251,000	10,632,400	--	--
Nashville (USET)	9,866	1,355,600	896,000	1,200,900	0	3,452,500	1,572	60,710
Navajo	106,317	13,929,200	3,638,100	8,313,300	647,300	26,527,900	18,407	500,770
Oklahoma	120,691	7,970,200	3,058,300	5,268,100	1,236,800	17,533,400	9,402	318,614
Phoenix	56,467	11,771,400	4,461,700	6,081,100	1,293,000	23,607,200	11,855	325,305
Portland	30,248	233,200	4,028,800	3,823,100	514,600	8,599,700	--	131,114
Tucson	11,696	2,595,300	426,000	1,979,600	0	5,000,900	1,321	36,598
Regions	0	25,500	0	9,000	0	34,500	--	--
Total FY 1973:	531,314	$79,585,173	$33,000,600	$51,539,100	$12,679,200	$176,804,073	75,506	2,329,160

IHS Allocations by Area and Budget Category, with Service Population and Utilization Data, Fiscal Year 1972

Area	Service Population	Direct Pt. Care	Indirect Pt. Care	Field Health	Other	TOTAL FY 72	Discharges	Outpatient Visits
Aberdeen	47,443	$7,783,100	$3,452,700	$4,795,197	$1,052,900	$17,083,897	12,786	306,412
Alaska	53,179	18,485,600	3,269,100	6,242,700	1,722,000	29,719,400	11,410	202,849
Albuquerque	36,035	3,652,400	2,251,400	3,166,600	1,724,800	10,795,200	3,700	140,853
Bemidji	24,423	982,700	1,402,100	1,215,000	0	3,599,800	1,980	53,986
Billings	28,589	2,901,000	3,719,300	3,811,000	911,300	11,342,600	3,310	194,278
Headquarters East	0	3,237,200	387,000	1,362,303	2,843,600	7,830,103	--	--
Nashville (USET)	9,559	1,239,600	822,000	723,600	0	2,785,200	1,663	56,511
Navajo	101,396	13,103,992	3,122,100	7,467,200	586,800	24,280,092	18,160	508,089
Oklahoma	113,548	7,468,400	2,858,400	4,317,300	1,156,600	15,800,700	9,496	311,115
Phoenix	54,057	11,067,100	4,149,100	5,059,800	1,228,200	21,504,200	12,144	323,935
Portland	28,528	263,800	3,728,800	3,283,700	481,400	7,757,700	--	104,117
Tucson	11,047	2,352,000	384,000	1,438,600	0	4,174,600	1,525	33,736
Total FY 1972:	507,804	$72,536,892	$29,546,000	$42,883,000	$11,707,600	$156,673,492	76,174	2,235,881

SOURCE: U.S. Congress, Office of Technology Assessment; based on documents from U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Indian Health Service, Program Statistics Branch (population and utilization data) and Resources Management Branch (budget allocations), Rockville, MD, 1985.

Appendix D

Acknowledgments and Health Program Advisory Committee

ACKNOWLEDGMENTS

This report depended heavily on the participation and experience of many people throughout the United States. The staff would like to especially acknowledge the following people for their valuable assistance.

Individuals who provided information from Indian Health Service sources included Thomas Berry, Anthony D'Angelo, Mary Elrod, Michael Gomez, Aaron Handler, Stephen Kaufman, Russell Mason, Richard McCloskey, Thomas Seidl, Craig Vanderwagen, and Cliff Wiggins. Other individuals who provided information and assistance included Jake Whitecrow, John O'Connor, and Scott Cull of the National Indian Health Board; Sheila Weinmann of the N.W. Portland Area Indian Health Board; Edna Paisano of the U.S. Bureau of the Census; and Linda Mellgren and Laurie Young of the U.S. Department of Health and Human Services. The staff would also like to acknowledge the contribution of the participants in the four regional meetings held in Portland, Oregon; Phoenix, Arizona; Rapid City, South Dakota; and Tulsa, Oklahoma.

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Appendix E

Method of the Study

The purpose of this assessment of Indian health care was to evaluate: 1) the health status of American Indians and Alaska Natives who are provided health care through the Federal Indian Health Service (IHS), 2) the health services provided to them in view of their health needs, and 3) the health delivery systems in which these services are provided. Also identified as a more specific issue to be evaluated was the growing problem of paying for high-cost care that cannot be provided in IHS facilities and that must be purchased from non-IHS providers. (Letters from Congress requesting and supporting the assessment follow this narrative.)

The assessment began on October 1984. Project activities included: selection of an advisory panel; two advisory panel meetings and other extensive reviews; four regional meetings with tribal representatives; site visits to Indian reservations and IHS service units; meetings and consultations with IHS personnel; analysis of Indian social and economic characteristics, health services, and health status; and responding to a special request in addition to the overall assessment.

The advisory panel for this assessment of Indian health care consisted of 19 members from Indian tribal governments and private and tribal health programs for Indians, policy analysts of Indian issues, and representatives of State governments, public health, medical economics, public policy/health care administration, sociology, and law. Rashi Fein, professor of the economics of medicine at Harvard Medical School, chaired the panel.

The first panel meeting was held on January 29-30, 1985. OTA project staff identified the sources of available information and presented a preliminary analysis of these sources to the panel. The panel discussed the overall study plan and provided advice on the focus of the study. Information for this assessment was obtained primarily from unpublished documents (more so than for usual OTA assessments), interviews, regional meetings, and site visits.

OTA project staff was also assisted by several contractors in preparing this assessment. In May-July 1985, four regional meetings were held by OTA in conjunction with the National Indian Health Board (NIHB), an organization that represents the tribes on health issues. The meetings were publicized in NIHB's newsletter, and a common agenda was used at the four meetings, which were held in Portland, Oregon; Phoenix, Arizona; Rapid City, South Dakota; and Tulsa, Oklahoma (the meeting agenda is described below). Several advisory panel members participated in meetings in their localities. The objectives of these meetings were to provide tribes and OTA staff with the opportunity to communicate directly with each other, and to confirm or correct the area-specific health status, socioeconomic, and health services information OTA had sent in advance of these meetings. In conjunction with the regional meetings, OTA project staff visited many reservations to gain a sense of the diversity and special concerns of the tribes.

Projections of the future Indian population were developed under OTA guidance by Henry Cole and S. Ken Yamashita of the Futures Group; computer analysis of data sources on Indian health status was provided by Steven Bjorge of Washington, D.C.; and Paul Alexander of the law firm of Alexander & Karshmer provided a legal analysis of the Federal-Indian relationship. (The method used in the Indian health status data analysis is described below.)

The advisory panel met again on October 28-29, 1985, to review a draft of the final report. Based on that meeting, the summary chapter was rewritten and again submitted to the panel for their review. The draft final report was sent for review to nearly 200 organizations and individuals. The OTA project director also attended the annual meeting of the National Indian Health Board in Albuquerque, New Mexico, in November 11-14, 1985, at which time the draft report was discussed in an open forum, with several advisory panel members participating in the discussion. The final report was submitted to OTA's Technology Assessment Board on January 17, 1986.

During the course of this assessment, the House and Senate Appropriations Subcommittees for the Department of the Interior and related agencies requested that OTA conduct an analysis of the number of beds and whether a surgical suite should be included in the replacement hospital planned for the Rosebud Sioux in South Dakota. The request was made in June 1985 because of a dispute between the Rosebud tribe and the Public Health Service on the size and services of the replacement hospital. The analysis was completed and delivered on August 1, 1985, in the form of an OTA staff memorandum. OTA's conclusions were that, using PHS's own criteria, a 30- to 35-bed instead of a 25-bed hospital was warranted, but that a surgical suite was not.

Purpose of the Regional Meetings

The regional meetings and site visits were held: 1) to give IHS's client population the opportunity to comment on the information OTA was gathering at the national level and on whether this information reflected the local situation; and 2) to provide OTA with information and opinions on local health issues, problems, and priorities. The meetings covered the following areas:

I. Characteristics of Indian peoples
    A. Tribal membership: eligibility, trends, general demographics
    B. Health status and special health problems
II. Delivery of health care
    A. Direct IHS services
    B. Self-determination (638) funds
    C. Contract care
    D. Other sources of funding (Medicare, Medicaid, private, etc.)
    E. Equity funding—criteria, application, impact
    F. High-cost ("catastrophic") contract care—impact on contract care funds, types of cases, trends, relationship to presence or absence of relevant IHS direct care services
    G. Health-related services: community health representatives, sanitation, housing, nutrition, other environmental services.

Health Statistics Information

IHS provided OTA with three data files on magnetic tape of the records of all American Indian and Alaska Native deaths during the years 1980, 1981, and 1982, as compiled by the National Center for Health Statistics (NCHS). In all cases, death rates computed by OTA represent the centered-average of the 1980-82 period.

There was a slight discrepancy between the number of records on the tape and the number of deaths as described in IHS publications. There were 20,200 death records on the tape supplied by IHS, while IHS publications list 20,210 deaths for this 3-year period. This was assumed to be a minor discrepancy and was not pursued further. IHS uses a matching program based on State, county, and community of residence to assign death records to an IHS service area. OTA excluded death records without an assigned IHS area. The number of death records assigned to all IHS areas during the 3-year period was 15,792.

These deaths were stratified into age-specific, sex-specific, and IHS-area-specific totals. Rates were calculated for each of the 72 selected causes of death that are used by NCHS in monitoring the health of the U.S. population. Age-specific, age-adjusted and cause-specific Indian death rates were computed: 1) for each of the 12 IHS service areas, and 2) for all areas, excluding California.

In California, especially in urban areas where most Indians in California live, health officials reported that Indian death statistics are not reliable and are probably too low because of reporting deficiencies. Examination of the calculated death rates showed that rates in California were indeed improbably low, casting doubt on the reliability of the reporting system on Indians in California. (For example, calculations of California Indian death rates result in rates less than half the U.S. all races rate, as well as being far below death rates for people residing in some of the wealthiest counties in the United States.)

OTA also made preliminary computations of deaths by reservation States, by service units, and by Standard Metropolitan Statistical Areas (SMSA) as a surrogate for urban areas. Analyses by reservation State were not pursued because of Congress' request that OTA concentrate on health status in IHS service areas. Analyses by service unit and SMSA were not pursued because in most cases the populations and numbers of death were too small for meaningful analysis.

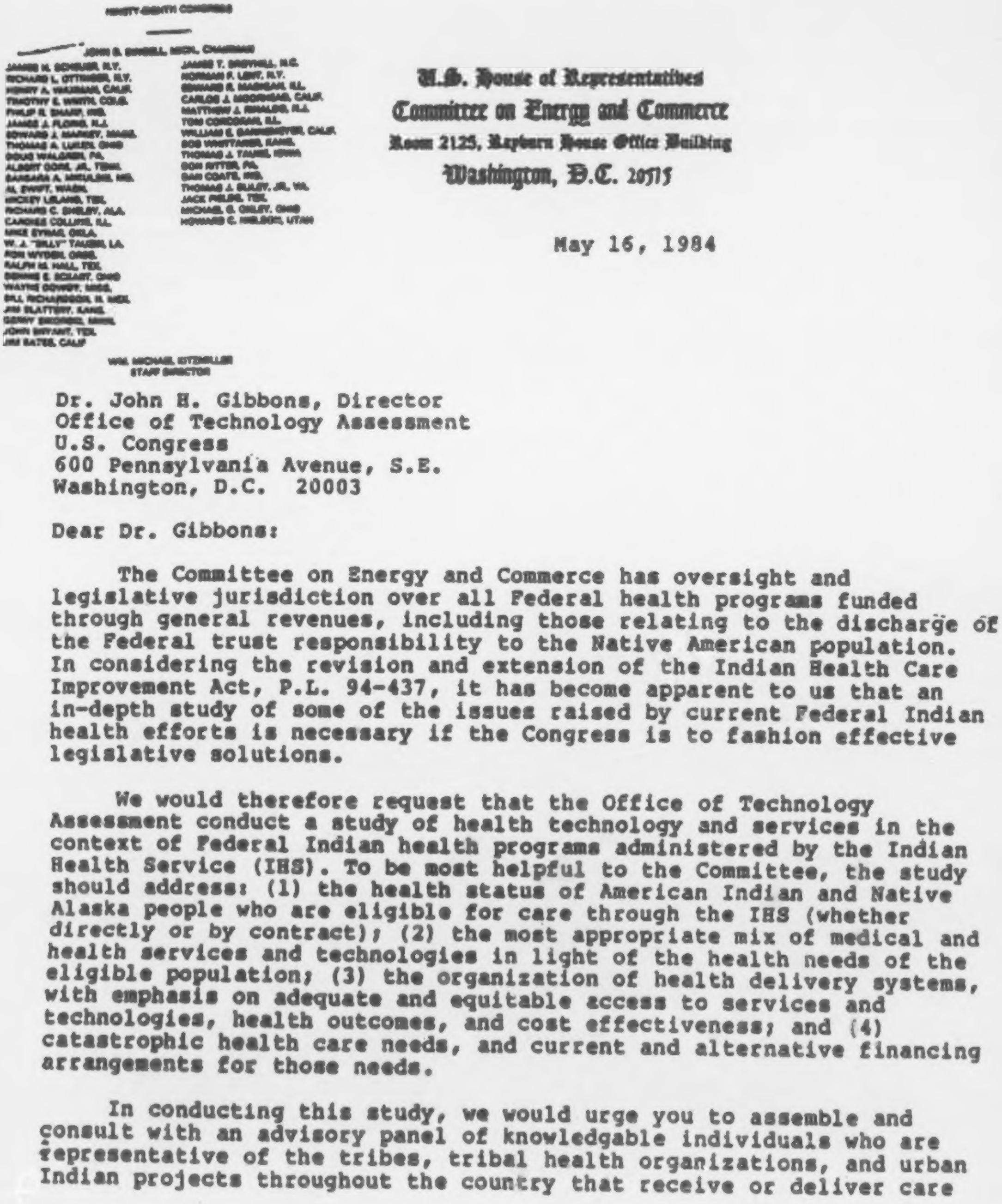
IHS service area populations that were used as the denominators for calculating death rates were computed in the following way. IHS used the 1980 census to determine population totals in IHS service areas. For succeeding years, IHS projects Indian population growth using actual birth and death data supplied by NCHS. OTA used these population estimates for each of the IHS areas, totaled for the 3-year period, 1980-82.

In order to arrive at age- and sex-stratified population totals for each of the IHS areas, tables supplied by IHS were also used. These tables were derived from the 1980 census and list the percent of population in each age and sex bracket for each of the 32 reservation States. These tables were used as a "best estimate" of the actual age and sex distribution in the various IHS areas because the majority of the Indian population in most reservation States actually live in or near IHS service areas, but their use may introduce some error.

Using these sex-stratified and age-specific death rates, age-adjusted death rates were computed, using the 1940 Standard Million Population and standard methodology. Each death rate was multiplied by its appropriate percentage of the standard million (based on sex and age), then these rates were summed to obtain the weighted averages that represent age-adjusted death rates for each of the selected causes in each of the IHS service areas. Age-adjusted death rates for the U.S. all races population were obtained from NCHS mortality reports and used to compute the ratio of Indian to U.S. all races death rates.

OTA also obtained published and unpublished data on the use of IHS health care services from IHS and used this information to analyze morbidity (illness and injury), needs for health care services, and access relative to that of the general population. Information concerning morbidity (illness) was derived from two IHS data sources: 1) the Inpatient Care System (IPC), which contains IHS direct care and contract care general hospital discharge data; and 2) the Ambulatory Patient Care System (APC), which contains information on the number of outpatient visits at IHS facilities by various patient characteristics (age, sex, diagnosis, community of residence, etc.). IHS provided OTA with computer tapes pertaining to its IPC and APC systems, its publications on hospital utilization by area (IHS, 1978, 1979, 1985), and printouts of the 15 leading diagnoses for outpatient visits by reservation State, county, IHS area, and IHS service unit. NCHS publications and unpublished data were the primary sources of information on U.S. all races health care utilization.

The limitations of all data sources on health status are discussed in chapter 4.



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STAFF DIRECTOR

U.S. House of Representatives
Committee on Energy and Commerce
Room 2125, Rayburn House Office Building
Washington, D.C. 20515

May 16, 1984

Dr. John H. Gibbons, Director
Office of Technology Assessment
U.S. Congress
600 Pennsylvania Avenue, S.E.
Washington, D.C. 20003

Dear Dr. Gibbons:

The Committee on Energy and Commerce has oversight and legislative jurisdiction over all Federal health programs funded through general revenues, including those relating to the discharge of the Federal trust responsibility to the Native American population. In considering the revision and extension of the Indian Health Care Improvement Act, P.L. 94-437, it has become apparent to us that an in-depth study of some of the issues raised by current Federal Indian health efforts is necessary if the Congress is to fashion effective legislative solutions.

We would therefore request that the Office of Technology Assessment conduct a study of health technology and services in the context of Federal Indian health programs administered by the Indian Health Service (IHS). To be most helpful to the Committee, the study should address: (1) the health status of American Indian and Native Alaska people who are eligible for care through the IHS (whether directly or by contract); (2) the most appropriate mix of medical and health services and technologies in light of the health needs of the eligible population; (3) the organization of health delivery systems, with emphasis on adequate and equitable access to services and technologies, health outcomes, and cost effectiveness; and (4) catastrophic health care needs, and current and alternative financing arrangements for those needs.

In conducting this study, we would urge you to assemble and consult with an advisory panel of knowledgable individuals who are representative of the tribes, tribal health organizations, and urban Indian projects throughout the country that receive or deliver care under current arrangements. The expertise that such individuals can bring to bear would, in our view, be of invaluable assistance to OTA in analyzing the issues to be considered by the study.

We understand that delivery of the printed report may not be possible until the fall of 1985. However, we would request that we receive an interim progress report on the study, interim briefings on specific issues as the need arises, and a formal briefing in July of 1985.

We look forward to your response. If you or members of the OTA staff have questions concerning this request, please contact Andy Schneider of the staff of the Subcommittee on Health and the Environment at 225-4952.

Sincerely yours,

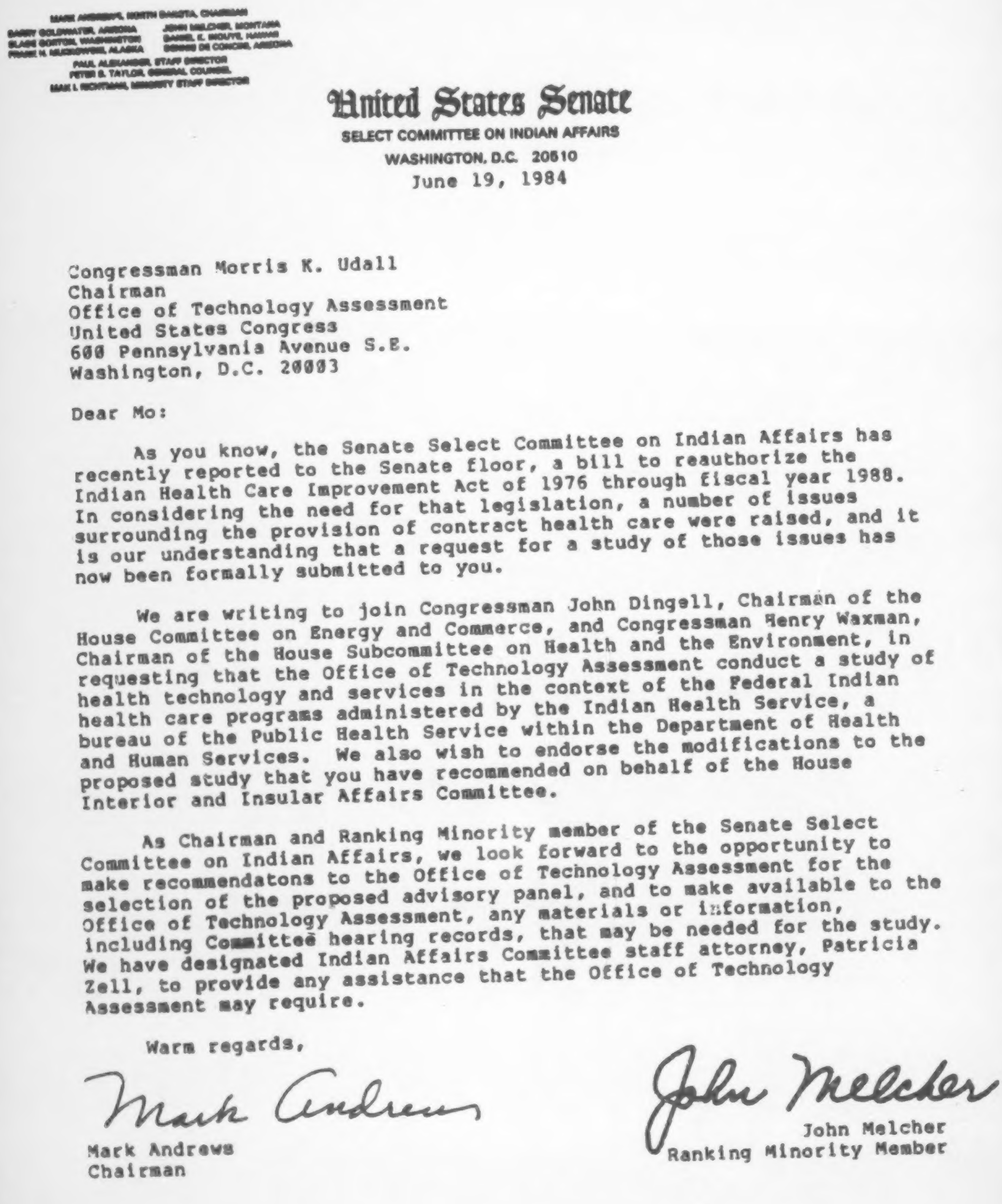
John D. Dingell

JOHN D. DINGELL, Chairman
Committee on Energy and
Commerce

Henry A. Waxman

HENRY A. WAXMAN, Chairman
Subcommittee on Health
and the Environment

HAW:asl



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United States Senate
SELECT COMMITTEE ON INDIAN AFFAIRS
WASHINGTON, D.C. 20510

June 19, 1984

Congressman Morris K. Udall
Chairman
Office of Technology Assessment
United States Congress
600 Pennsylvania Avenue S.E.
Washington, D.C. 20003

Dear Mo:

As you know, the Senate Select Committee on Indian Affairs has recently reported to the Senate floor, a bill to reauthorize the Indian Health Care Improvement Act of 1976 through fiscal year 1988. In considering the need for that legislation, a number of issues surrounding the provision of contract health care were raised, and it is our understanding that a request for a study of those issues has now been formally submitted to you.

We are writing to join Congressman John Dingell, Chairman of the House Committee on Energy and Commerce, and Congressman Henry Waxman, Chairman of the House Subcommittee on Health and the Environment, in requesting that the Office of Technology Assessment conduct a study of health technology and services in the context of the Federal Indian health care programs administered by the Indian Health Service, a bureau of the Public Health Service within the Department of Health and Human Services. We also wish to endorse the modifications to the proposed study that you have recommended on behalf of the House Interior and Insular Affairs Committee.

As Chairman and Ranking Minority member of the Senate Select Committee on Indian Affairs, we look forward to the opportunity to make recommendatons to the Office of Technology Assessment for the selection of the proposed advisory panel, and to make available to the Office of Technology Assessment, any materials or information, including Committee hearing records, that may be needed for the study. We have designated Indian Affairs Committee staff attorney, Patricia Zell, to provide any assistance that the Office of Technology Assessment may require.

Warm regards,

Mark Andrews
Mark Andrews
Chairman

John Melcher
John Melcher
Ranking Minority Member

Congress of the United States
House of Representatives
Washington, D.C. 20515

Dr. John H. Gibbons
Director
Office of Technology Assessment
U.S. Congress
Washington, D.C. 20510

Dear Dr. Gibbons:

As Chairman and Vice Chairman of the Office of Technology and Assessment Board, respectively, we take this opportunity to comment on the request of the Committee on Energy and Commerce for a study by OTA in the field of Indian Health. Additionally, Mr. Udall, as Chairman of the Committee on Interior and Insular Affairs, whose Committee has primary jurisdiction over Indian Affairs matters in the House of Representatives, brings to this issue a perspective and expertise which we feel OTA will be able to appreciate and utilize to the benefit of such a study as has been requested by the Committee on Energy and Commerce.

We feel that we can support the request of the Energy Committee for such a study and that this study can be helpful to the Congress and the Administration in meeting our responsibility to the Indian tribes for health services. However, in developing your schedule and plan for the OTA assessment, we ask that you take into consideration the following comments:

1. We are concerned about the implication in the Energy letter that the study be focused on the responsibility of the United States to provide health care to individuals on the basis of the racial identity. The Indian health care responsibility of the United States is founded upon the legal, moral and historical relationship between the United States and Indian tribes as political entities. In this regard, we refer you to the decision of the Supreme Court in the case of Morton v. Mancari, 417 U.S. 535 (1974). We suggest that your study be guided by the political relationship of the Federal government and Indian tribes rather than by the racial background of individual recipients of health services.

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2. This Federal-tribal relationship must encompass any review of unmet health needs and resource allocation and must be identified as the basis for a comprehensive health care system to meet that special responsibility. The review must also incorporate other factors besides population data, e.g., geographic location, accessibility to IHS and other health services, and lack of local infrastructure (roads, water and sewer systems, etc.).

3. We are supportive of Energy's request for an OTA assessment in the area of treatment of catastrophic illnesses, but with two reservations. First, Mr. Udall does not support that portion of the study as a substitute for the catastrophic illness provision in the Interior version of H.R. 4567. It remains Mr. Udall's intent to secure enactment of that provision into law. Second, we hope that this portion of the study not be shaped solely by the elements of the debate on that issue as a national health care issue. There are significant differences between that issue as a national issue and as an issue and problem for the Indian Health Service in providing health care to Indians. In this regard, we refer you to the discussion of the H.R. 4567 provision in the dissenting views of Mr. Richardson, et al. in the Energy Committee report on the bill (H. Rept. 98-763, Part 2).

4. Finally, we would like to recommend for OTA on the selection of members of any Advisory Board for this study.

Again, we thank you for keeping us and our Committee staffs advised on this matter. We would appreciate it if your office would continue to stay in touch as the development of the study progresses.

With warm regards,

Sincerely,

Mo Udall
MORRIS K. UDALL
Chairman
Office of Technology Assessment

Ted Stevens
TED STEVENS
Vice Chairman
Office of Technology Assessment

Appendix F

List of Acronyms and Glossary of Terms

Glossary of Acronyms

ADPL —average daily patient load
AFDC —Aid to Families with Dependent Children
AHCCCS—Arizona Health Care Cost Containment System
AIPRC —American Indian Policy Review Commission
ANCSA —Alaska Native Claims Settlement Act
APA —Administrative Procedures Act
BEMAR —backlog of essential maintenance and repair
BIA —Bureau of Indian Affairs (U.S. Department of the Interior)
CHR —community health representative
CHS —contract health services
CHSDA —contract health service delivery area
CRIHB —California Rural Indian Health Board
DHEW —U.S. Department of Health, Education, and Welfare
DHHS —U.S. Department of Health and Human Services
DRG —diagnosis-related group
ESRD —end-stage renal disease
GAO —General Accounting Office (U.S. Congress)
HMO —health maintenance organization
HRSA —Health Resources and Services Administration (PHS, DHHS)
HUD —U.S. Department of Housing and Urban Development
ICD-9 —International Classification of Disease, 9th Revision
ICU —intensive care unit
IHCIA —Indian Health Care Improvement Act
IHS —Indian Health Service (HRSA, PHS, DHHS)
ISDM —Indian self-determination memos
JCAH —Joint Commission on Accreditation of Hospitals
JTPA —Job Training Partnership Act
MoAs —Memoranda of Agreement
M&R —maintenance and repair
NCI —National Cancer Institute (National Institute of Health, PHS)
NHSC —National Health Service Corps (Bureau of Health Care Delivery and Assistance, HRSA, PHS, DHHS)
Ob-Gyn —obstetrics-gynecology
OFE —Office of Facilities' Engineering (HRSA, PHS, DHHS)
OMB —U.S. Office of Management and Budget
OTA —Office of Technology Assessment (U.S. Congress)
PCIS —Patient Care Information System
PHS —Public Health Service (DHHS)
PID —program information document
RAC —resource allocation criteria
RAM —resource allocation methodology
RPMS —Resource and Patient Management System
RRM —resource requirement methodology
SIDS —sudden infant death syndrome
SMSA —standard metropolitan statistical area
SSI —Supplemental Security Income
TRAIS —Tribal Resource and Assistance Information System
VA —U.S. Veterans Administration
WIC —Women, Infants, and Children [Program]

Glossary of Terms

Age-adjusted mortality rate: The death or mortality rate adjusted for the age distribution of the population under study. Age adjustment allows a direct comparison of the overall mortality experience of two or more populations, or to examine mortality over time in a single population, by using a single statistic. Age adjustment is necessary because populations differ in their proportions of people in different age categories, and different age groups have different mortality rates; for example, death rates for 25 to 34 year olds are much lower than for 55 to 64 year olds. Comparing populations without adjusting for the different age distributions of persons within each population (for example, a population with a high proportion of persons over 55 years of age versus a population with a high proportion of persons under 55 years of age) could lead to erroneous conclusions about the relative health of the populations being compared (see also "crude mortality rate" and "mortality rate").

Allotment: A Federal policy pursued in the late 19th and early 20th centuries to "civilize" Indians by: 1) assigning each adult Indian a specific amount of land (usually 160 acres); 2) setting aside a small amount of land for tribal purposes; 3) opening the resulting "excess" land to non-Indian settlement; and 4) holding the Indian land and proceeds from sales of the "excess lands" in trust for Indians until they became assimilated (see also "assimilation").

Alternate resources: Sources of health care other than those of IHS's contract care program that are available and accessible to the individual requesting the services or would be available and accessible upon application of the individual to the alternate resources, such as health care providers and institutions (including facilities operated by the Indian Health Service), health insurance, or other health care programs that pay for health services (e.g., Medicare or Medicaid) for which the individual may be eligible.

Area: The designated organizational unit and its corresponding geographical area through which IHS programs are administered. There are 12 IHS areas covering the 32 Reservation States.

Assimilation: A Federal policy pursued in the late 19th and early 20th centuries, in which tribally held communal lands were broken up and individual Indians were given allotments of land in order to induce them to leave their traditional ways of life and to become "civilized" (see also "allotment").

Blood quantum: The degree of Indian blood of an individual. Most tribes require a minimum degree of tribal-specific Indian blood for membership.

Buy Indian contracts: Contracts under the Buy Indian Act of 1910 between the Federal Government (especially BIA and IHS) and Indian businesses and organizations for the purchase of goods and services.

Catastrophic health care fund: A revolving fund proposed in 1984 and 1985 congressional legislation to assist in paying for high-cost cases in the IHS contract care program. The fund would have contained $12 million, to be used to pay for contract care cases that exceeded a threshold cost between $10,000 and $20,000 (see also "high-cost case").

Commissioned Corps: Members of the Public Health Service Commissioned Corps, including physicians, dentists, nurses, administrators, and other health-related personnel.

Community health representative (CHR): Indian health paraprofessionals who assist in providing health care, health promotion, and disease prevention services to Indians.

Contract services: Health care purchased by the IHS contract care program for eligible Indians from non-IHS providers and facilities when direct services of the appropriate types are not available or accessible (see also "direct services").

Cooperative agreement: An instrument similar to a grant for the transfer of Federal funds and program operation responsibilities to organizations such as Indian tribal governments. Cooperative agreements were introduced by the Federal Grants and Cooperative Agreement Act of 1977 (Public Law 95-224) and authorized for use in IHS and BIA self-determination (638) programs in 1984. The instruments had not been used by IHS as of the end of 1985.

Crude mortality rate: The death, or mortality rate, tabulated without being broken down into classes. The number of deaths in a population divided by the total population, over a defined period of time (see also "mortality rate" and "age-adjusted mortality rate").

Diagnosis-related groupings (DRGs): Groupings of diagnostic categories drawn from the International Classification of Diseases and modified by the presence or absence of a surgical procedure, patient age, presence or absence of significant comorbidities or complications, and other relevant criteria. DRGs are the case-mix measure mandated for Medicare's hospital prospective payment system by the Social Security Amendments of 1983 (Public Law 98-21) (see also "prospective payment system").

Direct services: Health care provided to eligible Indians in IHS-operated facilities (see also "contract services").

Equity fund: A fund established through additional congressional appropriations or through a set aside by IHS of a portion of its appropriations, and distributed to benefit IHS service units identified as being deficient in resources relative to other IHS service units.

Federal recognition: Refers to the relationship between Indian tribes and the Federal Government. Federal recognition can be obtained by satisfying the criteria of the Federal Acknowledgement Process administered through the U.S. Department of the Interior, by Federal statute enacted by Congress, or by court decree. Federally recognized tribes and their members are eligible for the special programs provided by the United States to Indians because of their status as Indians (see also "Indian tribe").

Health center: A relatively comprehensive ambulatory care facility that is open at least 40 hours per week (see also "health station").

Health location: Outpatient delivery sites that are staffed periodically by traveling IHS health personnel.

Health station: An ambulatory care facility, which may be a mobile unit, that is open fewer than 40 hours per week and offers less complete ambulatory services than a health center (see also "health center").

High-cost case: In care purchased by the IHS contract care program from non-IHS providers, refers to those cases that are much more expensive than the average contract care case, usually defined as exceeding a specific threshold in costs to IHS, such as $10,000 (see also "catastrophic health care fund").

Historical budget approach: Also referred to as "program continuity" budgeting, this is the IHS policy of allocating its annual appropriations among the 12 areas by granting each area its base budget from the previous year plus a share of any funding increases equal to the area's proportion of the overall IHS budget.

Incidence rate: The frequency of new occurrences of disease within a defined time interval in a defined population. Incidence rate is the number of new cases of specific disease divided by the number of people in a population over a specified period of time, usually 1 year (see also "prevalence").

Indian: Indians in the Continental United States, and Indians, Aleuts, and Eskimos in Alaska.

Indian preference: An absolute preference for persons of Indian descent in making appointments for Federal employment in BIA and IHS, whether the placement in the position involves initial appointment, reappointment, reinstatement, transfer, reassignment, promotion, or any other personnel action intended to fill a vacancy.

Indian tribe: Any Indian tribe, band, nation, group, Pueblo, rancheria, or community, including any Alaska Native village, group, or regional or village corporation. A tribe may be federally recognized, State-recognized, or self-recognized and/or federally terminated. In the context of the Federal-Indian relationship, tribes must be federally recognized in order to be eligible for the special programs and services provided by the United States to Indians because of their status as Indians (see also "Federal recognition").

Infant mortality rate: The number of deaths among children less than 1 year old as a fraction of the total number of live births in a year.

Montana Amendment: Refers to a demonstration program contained in 1984 legislation that was vetoed by the President, which would have prohibited IHS from applying its alternate resource rule to medical or health assistance for indigent Indians in Montana if the assistance was funded by the revenues from any tax imposed on real estate, and the Indian patient resided on a reservation or restricted Indian land which was not subject to taxation. Also known as the "Melcher Amendment," after its sponsor, Senator John Melcher (D-Mont.) (see also "alternate resources," "primary provider," and "residual payer").

Morbidity: The condition of being diseased.

Mortality rate: The death rate, often made explicit for a particular characteristic; e.g., age, sex, or specific cause of death (see also "crude mortality rate" and "age-adjusted mortality rate"). A mortality rate contains three essential elements: 1) the number of people in a population group exposed to the risk of death (the denominator); 2) a time factor; and 3) the number of deaths occurring in the exposed population during a certain time period (the numerator).

Neonatal: Pertaining to the first four weeks after birth.

Perinatal: Pertaining to, or occurring in, the period shortly before and after birth; variously defined as beginning with the completion of the 20th to 28th week of gestation and ending 7 to 28 days after birth.

Prevalence rate: The number of existing cases of a disease in a defined population at a particular time or over a specified time period.

Primary provider: Refers to IHS's description of alternate resources in its contract care program. Alternate resources or "primary providers" must be used first before IHS will pay for contract care services by non-IHS providers (see also "alternate resources," "contract services," "residual payer," and "Montana amendment").

Prospective payment system: A hospital payment method in which the amount that a hospital is paid for services is set prior to the delivery of those services and the hospital is at least partially at risk for losses or stands to gain from surpluses that accrue in the payment period. Prospective payment rates may be per service, per capita, per diem, or per case rates. Medicare's DRG payment system for inpatient hospital services is a particular form of prospective payment (see also "diagnosis-related groupings").

Reservation: The geographic area set aside by treaty or other law for a federally recognized Indian tribe, including reservations, Pueblos, rancherias, or colonies, former reservations in Oklahoma, Alaska Native regions established pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601 et seq.), and Indian allotments.

Reservation State: A State in which there is at least one federally recognized Indian tribe and in which the IHS therefore provides or finances health care for eligible Indians. There were 32 such States as of 1986.

Residual payer: Refers to IHS's position that other sources of payment available to the patient must be used first before IHS will pay for contract care services by non-IHS providers (see also "alternate resources," "contract services," and "primary provider").

Retrocession: The voluntary return of a contracted program, or portion thereof, to the Federal Government pursuant to section 106(d) of the Indian Self-Determination and Education Assistance Act (Public Law 93-638) (see also "self-determination" and "638 contract").

Self-determination: A policy established in 1975 in the Indian Self-Determination and Education Assistance

Act (Public Law 93-638) to encourage maximum Indian participation in the planning, conduct, and administration of Federal programs and services provided for Indians by IHS and BIA, by transferring responsibilities for these programs and services from the Federal Government to Indian tribes (see also "retrocession" and "638 contract").

Service population: The Indian population residing in geographic areas that are served by IHS. Of the 1.4 million Indians identified in the 1980 Census, approximately 829,000, or 59 percent, resided in IHS service areas. The estimated service population in 1986 was 989,000 (see also "Reservation State").

Service unit: The basic health care delivery unit that comprise an IHS area. A service unit may serve a tribe or several tribes, and usually 10 to 20 service units make up an IHS area (see also "area").

Snyder Act: The basic authorizing legislation enacted in 1921 (42 Stat. 208; 25 U.S.C. section 13) for Federal health and social services programs for Indians.

Termination: Refers to Federal policy after World War II and continuing into the early 1960s, which had several components: 1) induced resettlement of thousands of reservation Indians into urban centers where they were to be trained and employed; 2) the transfer of major functions, responsibilities, and jurisdiction over Indians to States from the Federal Government; and 3) the termination of the Federal relationship with specific tribes, including ending services and distributing tribal assets to individual tribal members.

Third-party payer: Refers to a party, other than the provider or patient, which pays for the patient's health care, such as the patient's health insurance company or governmental programs (e.g., Medicare and Medicaid).

Transfer Act: Legislation (42 U.S.C. sections 2001 et seq.) that transferred responsibility for Indian health care from the Bureau of Indian Affairs in the U.S. Department of the Interior to the Public Health Service in what is now the U.S. Department of Health and Human Services, creating IHS in 1955.

Tribal trust land: Lands held in trust for Indian tribes and administered for their benefit by the Federal Government (see also "trust responsibility").

Trust responsibility: The responsibility assumed by the Federal Government, by virtue of treaties, statutes and other means, legally associated with the role of trustee, to recognize, protect, and preserve tribal sovereignty and to protect, manage, develop, and approve authorized transfers of interests in trust resources held by Indian tribes and Indian individuals.

Urban Indian programs: Programs administered by urban Indian organizations and supported with IHS funds that operate health centers and help urban Indians gain access to other programs for which they might qualify, such as Medicaid and other public assistance sources.

638 contract: Contracts between Indian tribes or tribal organizations and Federal agencies (i.e., IHS and BIA), under which tribes assume planning, operation, and administration of programs and services for Indians from the Federal Government (see also "self-determination" and "retrocession"). Authorized by the Indian Self-Determination and Education Assistance Act of 1975 (Public Law 93-638).

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